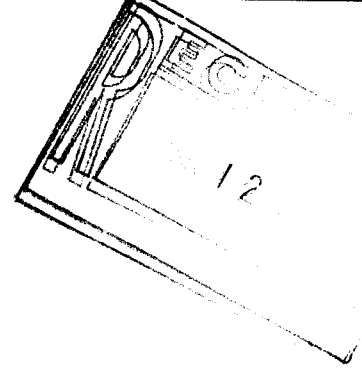




**Chemical Waste Management, Inc.**

4227 Technology Drive  
Fremont, California 94538-6337  
415/651-2964



March 05, 1990

Mr. Jeffrey Zelikson  
Director  
Hazardous Waste Management Division  
U.S. Environmental Protection Agency  
215 Fremont Street  
San Francisco, CA 94105

Mr. Dennis Dickerson  
Regional Administrator  
California Department of Health Services  
1405 North San Fernando Boulevard  
Suite 300  
Burbank, CA 91504

RE: Phase II RCRA Facility Investigation (RFI) Workplan for the  
Oil and Solvent Process Company (OSCO) Facility, Azusa,  
California. **(CAD008302903)**

Permit Conditions VI. 6. B. and VI. 6. C.

Gentlemen:

Enclosed is the Phase II workplan which details further subsurface investigations proposed for the OSCO Facility. This workplan addresses both shallow and deep soil sampling RFI requirements for the site (permit conditions VI. 6. B. and VI. 6. C. respectively).

Also attached is the required certification statement in accordance with 40 CFR 270.11.

If you have any questions regarding the enclosed please call me at (415)651-2964.

Sincerely,


CHEMICAL WASTE MANAGEMENT, INC.

A handwritten signature in cursive script, reading 'Peter W. Coutts', is written in dark ink.

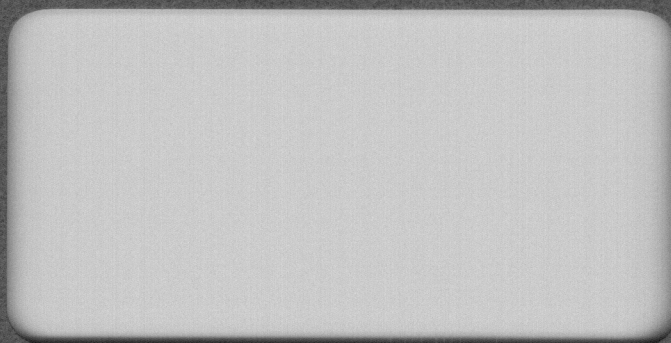
Peter W. Coutts  
Project Hydrogeologist

PC/lmc

I certify under penalty of law that this document and all attachments were prepared under the direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

  
\_\_\_\_\_  
William J. Mitzel  
General Manager  
Oil & Solvent Process Company

  
\_\_\_\_\_  
Date



**WESTERN TECHNOLOGIES INC.**

The Quality People

**PHASE II WORK PLAN  
FOR THE  
OSCO FACILITY  
AZUSA, CALIFORNIA  
WTI JOB NO. 219-9J-005**

**PREPARED FOR:**

**CHEMICAL WASTE MANAGEMENT, INC.**  
4227 Technology Drive  
Fremont, California 94538-4926

**PREPARED BY:**

**WESTERN TECHNOLOGIES INC.**  
16801 Van Buren Boulevard, Suite B  
Riverside, California 92504

**March 2, 1990**



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## **OSCO PHASE II RFI PROJECT MANAGEMENT PLAN**

### **1.0 INTRODUCTION**

In accordance with the requirements of the Environmental Protection Agency (EPA) and Department of Health Services (DHS) RCRA Part B Permit, the Oil and Solvent Process Company (OSCO) has prepared this Project Management Plan (PMP) for the RCRA Facility Investigation (RFI). The scope of the PMP includes the following:

- Technical Approach
- Schedule
- Personnel, including Qualifications, and
- Management Approach.

OSCO has completed the Soil Gas Survey required for the RFI, and submitted same to the EPA and the DHS on January 19, 1990 in a report entitled "Phase I-IA Soil Gas Investigation, OSCO Facility, Azusa, California".

This Work Plan covers Phase II investigations proposed for the OSCO facility. Phase II investigations will include both shallow and deep soil sampling and deep soil gas characterization, so as to expedite the RFI process.

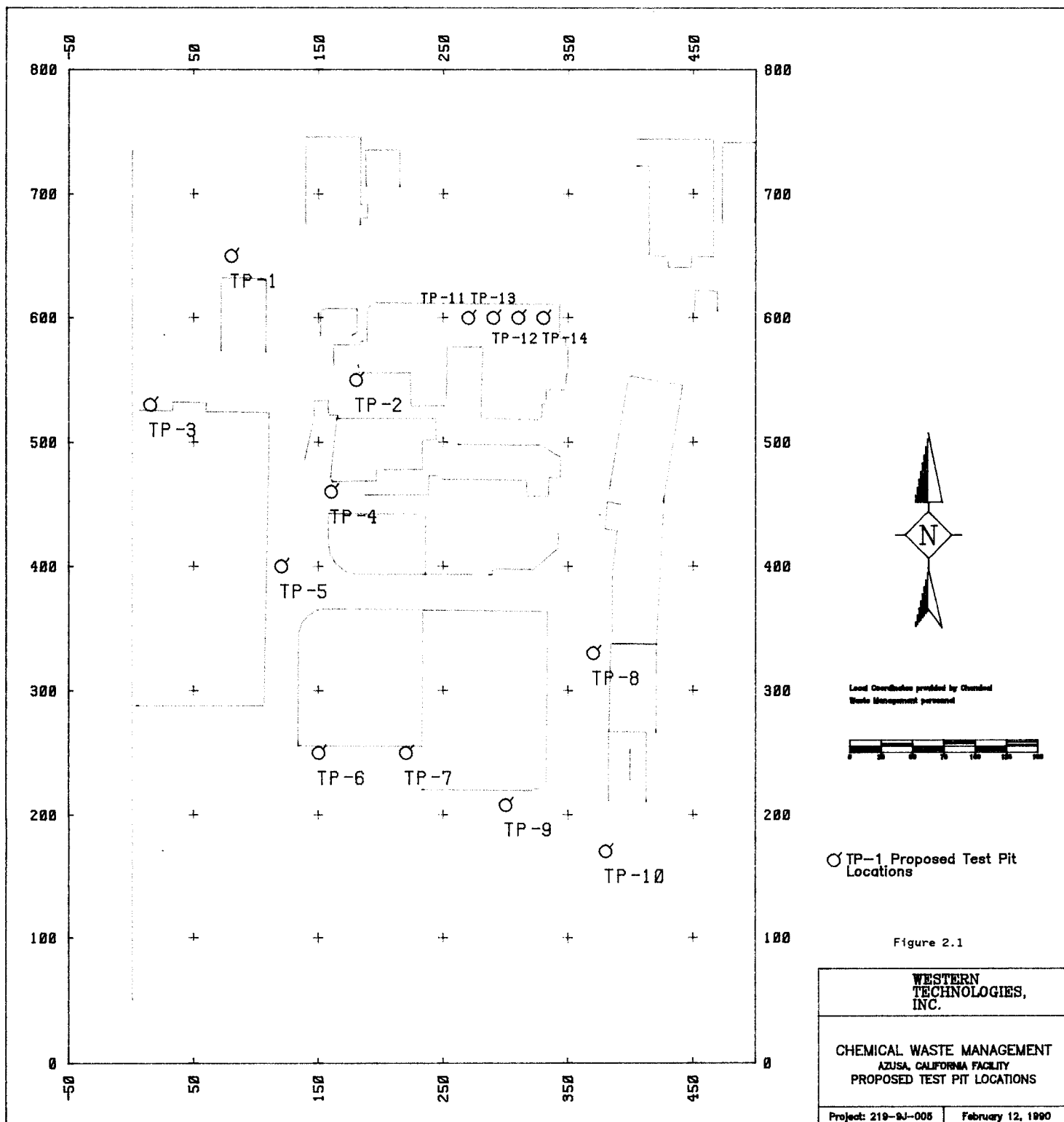
### **2.0 TECHNICAL APPROACH**

The overall technical approach presented herein is consistent with the requirements for the RFI. Specifics of the approach for the shallow soil sampling and the deep soil sampling are discussed in subsequent subsections.

#### **2.1 Shallow Soil Sampling**

Fourteen (14) test pits will be excavated to a nominal depth of five (5) feet at the locations shown in Figure 2.1. Four (4) test pits will be excavated beneath Unit 1, which is proposed for RCRA partial closure. Ten (10) test pits will be located elsewhere in the facility. Excavation will be performed using a backhoe; specifics of the sampling and decontamination procedures are presented in the Sampling and Analysis Plan (SAP).





Each test pit will be approximately three to six feet in each dimension, depending on materials encountered and wall stability. A Registered Geologist will supervise the sampling and preparation of lithologic logs of the test pits. These logs will describe the materials encountered using the Unified Soil Classification System. Each log will include a brief geologic description of materials, and will complement sketches and photographs of the pit walls and floor.

Soil samples will be obtained from depths of 1, and 3 feet using a stainless steel trowel. Drive samples at these depths are generally precluded, due to the cobbles and boulders present in the soils. The five foot sample will be a floor sample taken with the excavator bucket. Individual wall samples at the stated depths will be taken from the north wall unless obvious soil staining, odor, PID response or other indicator clearly shows contamination on other walls. In this latter circumstance, samples will be taken from the contaminated surface and will be submitted for analysis. Analyses for the samples obtained at 1-foot depth will be for volatile organic compounds using EPA Method 8240, semi-volatile organics using EPA method 8270 and metals. Additional sampling requirements are included in the attached Sampling and Analysis Plan (SAP).

After receipt of the analytical results from the test pits, indicator ("target") parameters will be selected based on those results and the soil gas survey results. Criteria for target parameter selection will also include the mobility and leachability of the compounds, and the sample volume required for analysis. Target parameters will be analyzed in the deep soil sample program. The target parameter list(s) will be submitted to EPA and DHS for their approval. For scheduling purposes, OSCO assumes that the agencies will provide approval within 15 working days of receipt of the target parameter list(s).

Products of the shallow soil sampling efforts will include the following:

- Location maps
  - Test pit locations
  - Sample locations within pits
- Lithologic logs
- Sketches and photos of each sampled pit wall
- Sample analysis results
  - Lab sheets
  - Tabulation
- Interpretive results
  - Contaminated soil depths and extents
  - Types of contamination in each area
  - Target parameter determination

These products will be included in the Phase II RFI report.



## 2.2 Deep Soil Sampling

Six (6) deep soil borings will be advanced to minimum depths of 100 feet at the locations shown in Figure 2.2. The locations of the borings are based on the Phase I-IA soil gas results and previous investigations at the facility. Two of the borings (B-3 and B-5) are located in the drum storage area. One boring (B-6) is located in the southeastern portion of the facility. Boring B-2 is located near the former underground sump. Boring B-3 is located within ten feet of sampling point OS-10. Borings will be performed under the supervision of a Registered Geologist. Sampling and decontamination will be consistent with the provisions of the SAP.

Target depths for sampling in all borings will be 5-foot intervals to a depth of 20 feet, 10 foot intervals to a depth of 50 feet, and 20-foot intervals thereafter. If samples cannot be collected at the specified depths, the depths shall be selected in the field based on the stratigraphy and other conditions encountered during drilling. For example, soils that are fine-grained, discolored, or moist will be sampled. Samples will be taken using a driven split-spoon sampler. The borings will be advanced using a dual-wall reverse air circulation rig equipped with a downhole percussion hammer.

On-site analyses in a mobile laboratory using EPA methods 8010 and 8020 will be performed during drilling. Boring depths will be a minimum of 100 feet. Total depths will be field-determined depending on the observed increase, decrease or oscillation with depth of target compound concentrations in the samples. Target compound concentrations will be determined at the facility using a mobile laboratory. OSCO will submit 10 percent of the samples for confirmatory analysis to an off site California certified laboratory.

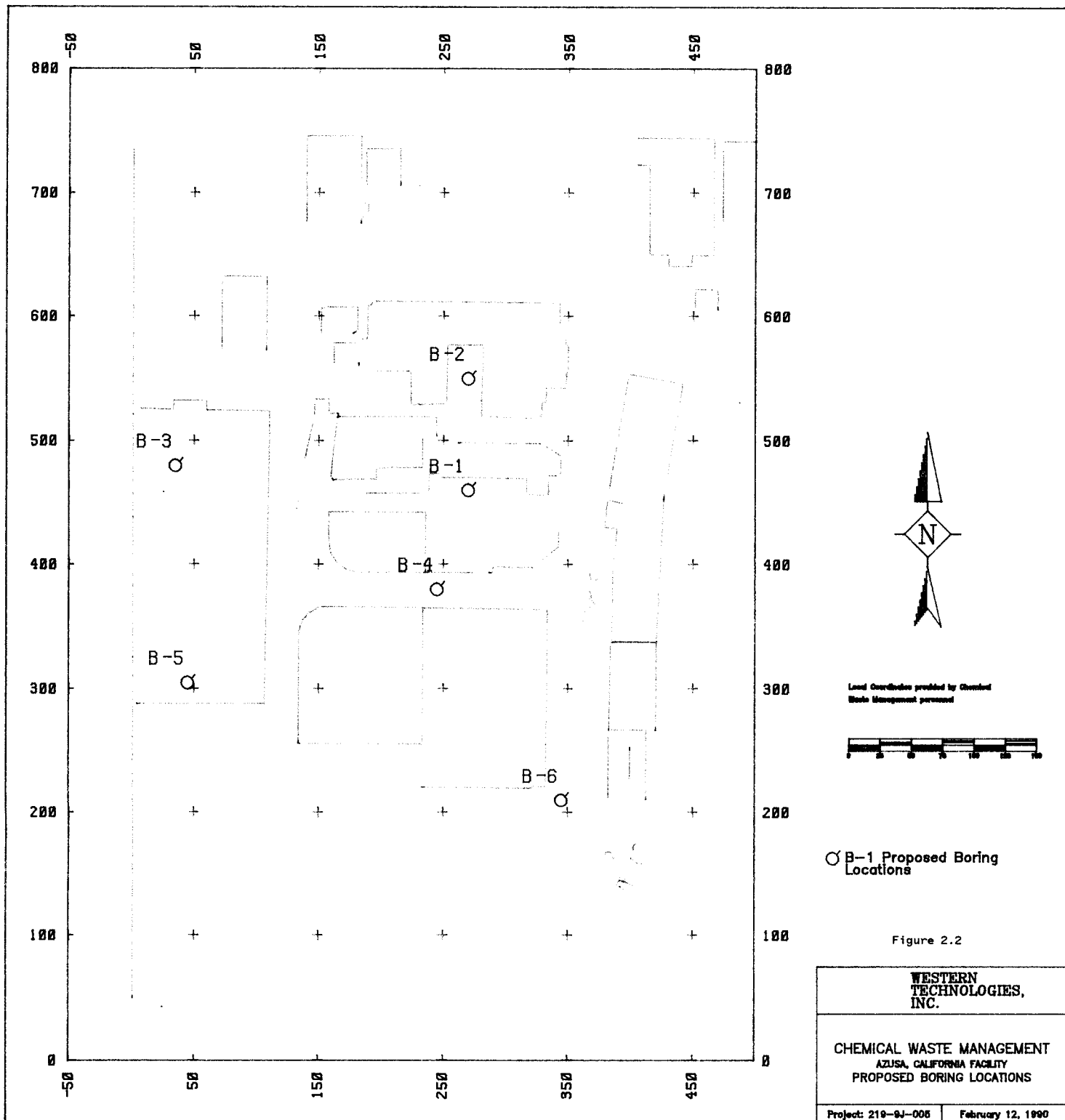
After reaching total depth, each boring will be geophysically logged using the following methods:

- Neutron
- Gamma-gamma density
- Natural gamma.

This information will be used to corroborate lithologic logs prepared from cuttings and samples, and to deduce (if possible) the distribution of porosity and moisture in the soils.

OSCO will subsequently install soil gas monitoring probe nests into each boring. Depths and numbers of probes will be determined from the on-site laboratory, lithologic and geophysical log results. OSCO anticipates that three soil gas monitoring probes will be installed in each boring. Each probe will be constructed of a 3/4-inch diameter stainless steel screen surrounded by select sand pack materials, and isolated from other probes and the surface by bentonite and cement grout seals. A five-foot long stainless steel riser pipe will be installed above the screen. Seal depths





will be selected on the basis of observed lithology. The screen and stainless steel riser will be connected to the ground surface by means of 3/4-inch diameter Schedule 80 PVC pipe. This will allow direct sampling through the PVC pipe, or if necessary via a teflon-lined tube and packer installed in the stainless steel riser pipe. A protective casing will be installed atop each soil gas probe nest.

The soil gas probes will be sampled approximately one week or more after completion, in order to allow reequilibration of the soil gas and moisture system in the vicinity of each boring. At least three pore and probe volumes will be evacuated before taking the sample for analysis of target compounds.

In order to obtain soil gas samples from greater distances from the borehole, evacuation will continue over longer periods of time. Samples obtained over greater distances and volumes will help develop volumetric average contaminant concentrations that overcome concerns about "point source" samples and tortuous contaminant travel paths.

OSCO will do this soil gas sampling, such that a greater representative volume of the deep soils are evaluated by each soil gas probe. The soil gas volume required to be purged before obtaining a sample at a given distance can be approximated by calculating the cylindrical volume of gas occupied pore space to that distance over the effective vertical dimension of the soil gas probe and sand pack.

After completion of the borings, samples may be selected for soil property analyses. These analyses will address the mobility and fate of detected compounds in the soils. Analyses may include:

- Moisture content
- pH
- Porosity
- Hydraulic conductivity
  - Partial saturation
  - Fully saturated
- Adsorptivity
  - TOC
  - Koc
  - Kow.



# SOIL GAS PROBE SCHEMATIC

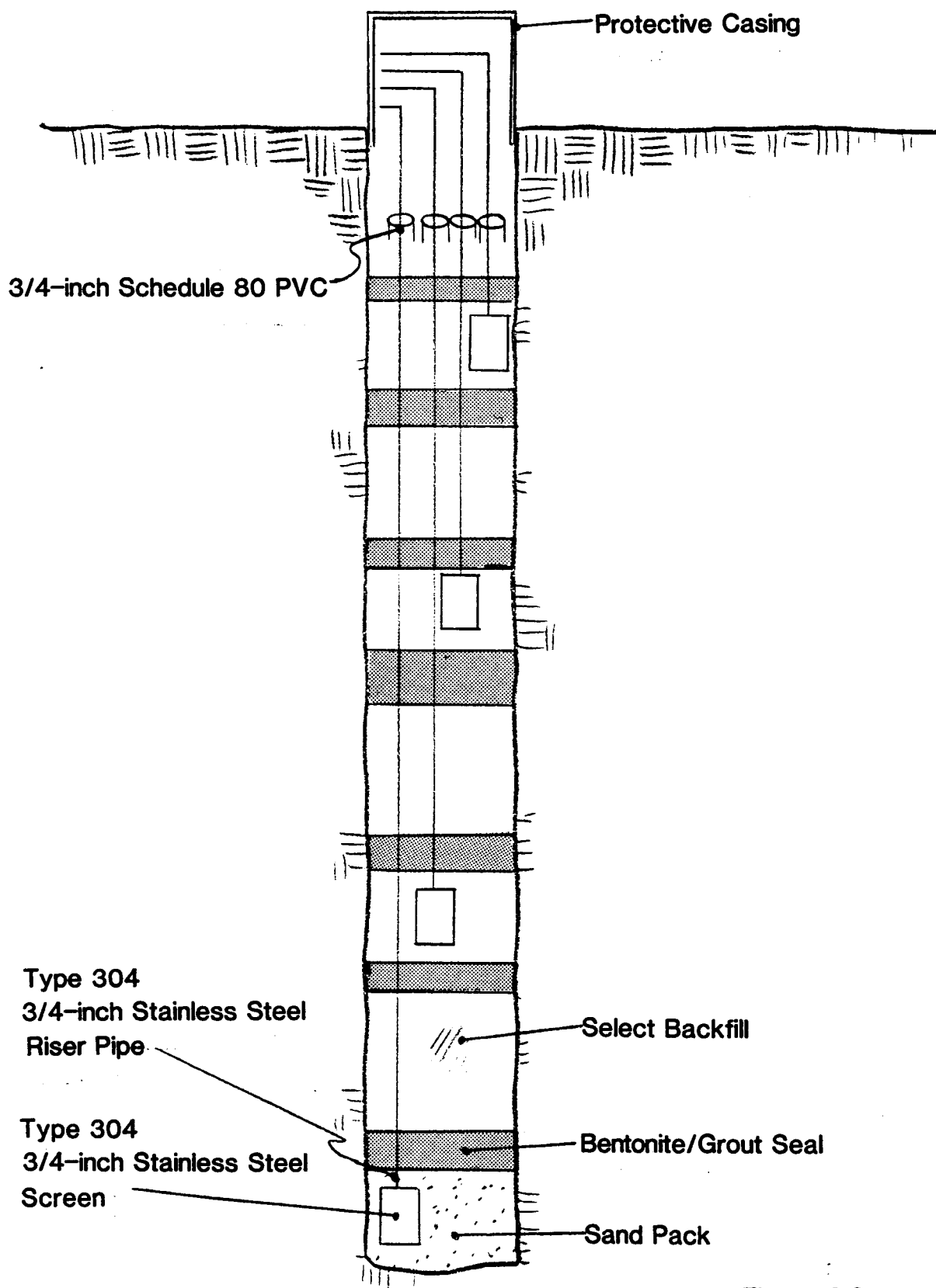


Figure 2.3

Products of the deep soil sampling efforts will include the following:

- Location map
- Lithologic logs
- Geophysical logs
- Sample analysis results
  - Lab sheets
  - Tabulation
- Target compound concentration versus depth plots
- Interpretive results
  - Contaminated soil depths and extents
  - Types of contamination in each area
  - Controls on contamination migration
  - Estimated rate of contamination migration.

These products will be included with the shallow soil sampling results in the Phase II RFI report.

### 3.0 SCHEDULE

The schedule for Phase II of the RFI is depicted in Figure 3.1. Schedule assumptions include:

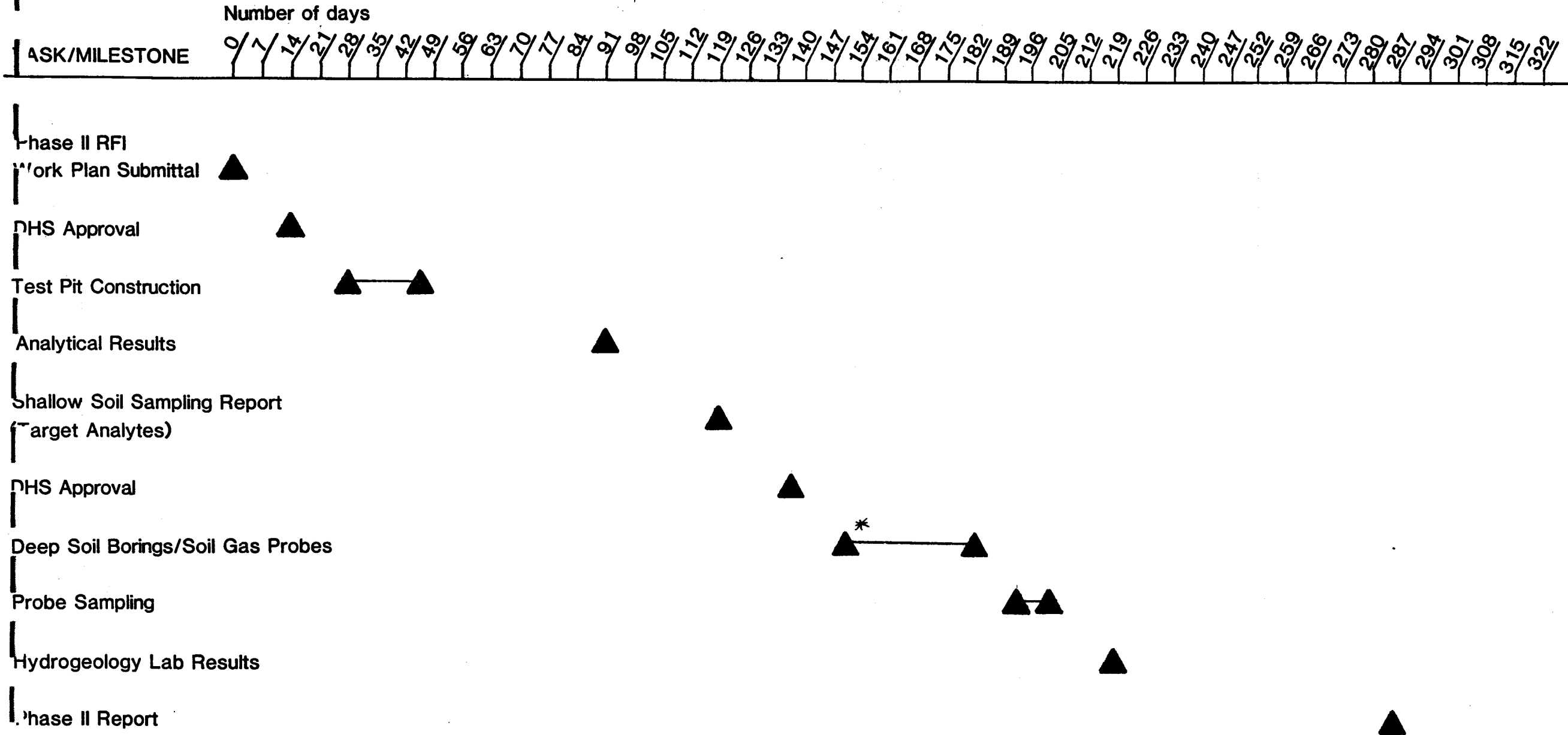
- Plan approval within 15 days of submittal
- 15 day approval of target compound list
- Do not have resample at 3 and 5 feet in the test pits for semi-volatiles and metals
- Usable analytical data within 45 days for shallow soil test pits
- Assume target compound to be only 8010 and 8020 and only need confirmatory analysis for 10 percent of 60 samples
- Assume boring depths to 100 feet.

OSCO plans to implement the shallow soil sampling fifteen five days after receipt of EPA and DHS approval. Field work should be completed within fifteen working days from start of pit excavation. Confirmed analytical results will be available 45 days after excavation is complete. Raw analytical data will be submitted 15 days after receipt of data. The shallow soil sampling report, including recommendations for target analytes, will be delivered to EPA and DHS 30 days after analytical results are obtained.



# PROPOSED WORK PLAN SCHEDULE

## OSCO Phase II RFI



\* 15 day extension granted  
See OSCO ltr of 30 Nov. 90

Figure 3.1

OSCO will begin the deep soil sampling plan 15 days after EPA and DHS approval of OSCO recommended analytes. Boring and soil gas probe construction should be completed within 30 days. Soil gas sampling from the probes will be performed within 10 days following construction. Soil property results should be completed within 30 days after sampling. Modeling and report preparation will be completed within 30 days of receiving physical and chemical analytical results. Submittal of the Phase II RFI report to EPA and DHS will be 60 days after receipt of analytical data.

#### **4.0 PERSONNEL AND MANAGEMENT APPROACH**

The organization of the Phase II RFI personnel and organizations is shown in Figure 4.1. and 4.2. Qualifications of the personnel, as indicated by their resumes, are attached to this plan. Contractor resumes, analytical laboratory QA/QC procedures and appropriate registrations and permits will be submitted after final contractor selection.

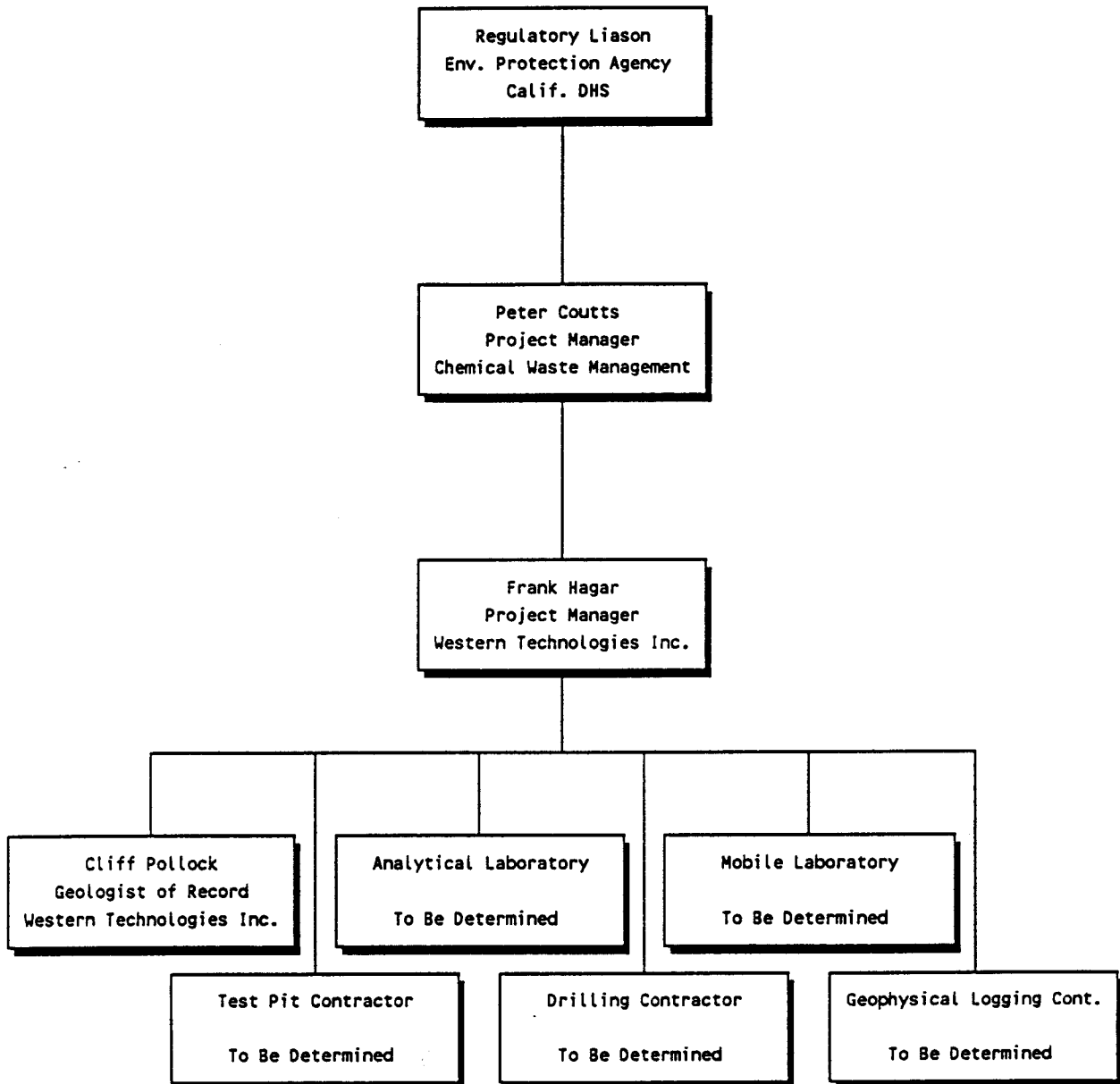
The overall management structure of the Phase II RFI is shown in Figure 4.1. The project manager for the RFI, Mr. Peter Coutts of Chemical Waste Management, will ensure coordination of project elements and timeliness of OSCO efforts. Mr. Coutts will also manage communications between OSCO, EPA, and DHS. Mr. Frank Hagar of Western Technologies, Inc. will be the task manager for the soil sampling efforts, and will report to Mr. Coutts. Mr. Clifford Pollock, P.E., R.G., will be the Registered Geologist overseeing site investigations.

Analytical laboratories will provide their results to Mr. Hagar. The labs will be selected after approval of the work plan. The test pit contractor will be determined and will report to Mr. Hagar or Mr. Pollock. The drilling contractor will be determined, and will also report to Mr. Hagar and Mr. Pollock.

Mr. Coutts will track the progress of the Phase II RFI, and will provide quarterly written reports to EPA and DHS. These reports will itemize work accomplished in the reporting period, any problems encountered, and resolutions to current or past problems.



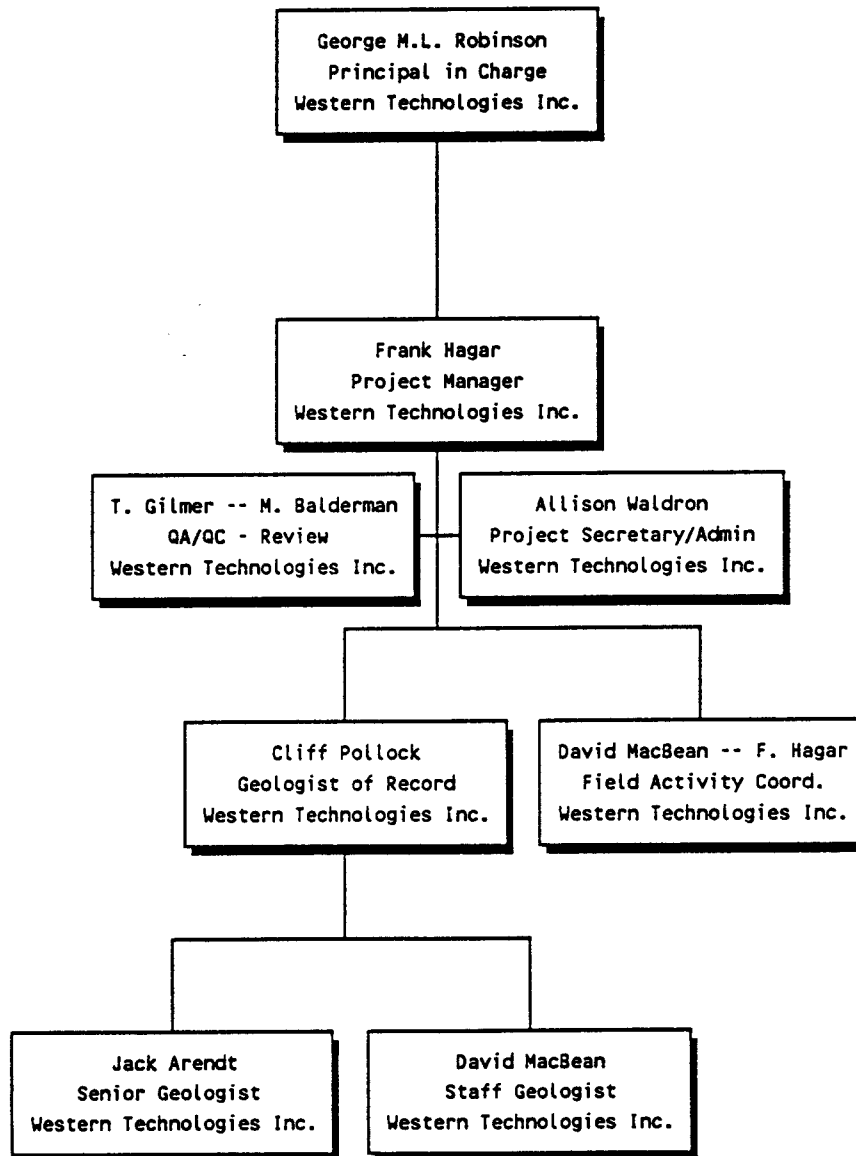
Figure 4.1  
OSCO Phase II RFI  
Organizational Structure



Proj. No. 219-9J-005  
February 28, 1990



Figure 4.2  
Western Technologies Inc.  
OSCO RFI Project Personnel



Proj. No. 219-9J-005  
February 28, 1990



**PETER W. COUTTS**  
**PROJECT MANAGER**

**EDUCATION**

B.S., Geological Sciences, Ohio University, 1984.

College of Business, Akron University, 1977-1979.

**EXPERIENCE SUMMARY**

1988 - Present    Chemical Waste Management, Inc., Fremont, California  
Project Hydrogeologist/Project Manager

Project Hydrogeologist/Project Manager for geologic and groundwater related programs at five hazardous waste facilities located in the Western United States and Mexico.

Management, design, and implementation of detailed site characterization studies, hydrogeologic investigations and corrective action programs. Development, review and implementation of RCRA Facility Investigation (RFI) workplans. Management and design of groundwater and vadose zone characterization/monitoring programs, remedial action program design, and water resource evaluation and development.

Technical support for Western Region, bid and proposal review, consultant/contractor selection and management, agency interaction and preparation of contractual agreements.

1985-1988        O.H. Materials Corporation, Findlay, Ohio/Sacramento, California  
Project Hydrogeologist

Extensively involved in hydrogeological investigations, site characterization studies, and groundwater remediation programs at numerous superfund sites, manufacturing and industrial facilities, refineries, hazardous waste sites, and emergency response situations.

Capabilities include site investigation and remedial action program design. Supervision of the design and installation of groundwater monitoring wells and product recovery systems. Application of knowledge and techniques in aquifer pump and slug tests, surface and borehole geophysical methods, groundwater modeling, soil sampling, surface and groundwater sampling, surveying, project management, proposal and report generation.

1984-1985        Hywell Inc., Belpre, Ohio.  
Well Site Geologist

Provided technical supervision for hydrocarbon exploration operations. Targeted formation tops and estimated thickness through correlation of existing stratigraphic and geophysical logs and triangulation of data. Responsibilities included maintaining a lithologic log, monitoring a gas chromatograph and recording fluorescence properties of drill returns to determine location and potential of pay zones.

1980              Dual Offshore Drilling Company, Lafayette, Louisiana  
Roughneck

**PROFESSIONAL AFFILIATIONS**

Association of Groundwater Scientists and Engineers  
California Groundwater Association



**GEORGE M.L. ROBINSON, P.G.**  
**Principal in Charge**

**EDUCATION**

M.S., Hydrogeology, Kent State University, 1972.

B.S., Geology, Eastern New Mexico University, 1970.

Post Graduate Studies, Soil Mechanics, Lakeland State College, 1973.

**EXPERIENCE SUMMARY**

1988 - Present Western Technologies Inc.

Vice President - Rocky Mountain Region

Responsible for business development and client relationship activities serving the Rocky Mountain Region. Directs operations to include project management; report preparation; surface/ground water hydrology technical reporting; written report quality assurance/quality control; data base management; permit preparation; EA/EIS preparation; and budget control. Provides expert testimony and regulatory compliance strategies to meet client needs.

1984 - 1988

EnecoTech Inc.

President/Founder and Senior Hydrogeologist

Responsible for project management; preparation of permit applications; environmental assessments and surface/ground water hydrogeological studies. Hazardous waste management and hydrogeological expertise including computer database development; surface/ground water modeling; RI/FS and permit preparation.

Acquired extensive experience in states of Arizona, Colorado, Montana, Nevada, New Mexico and Utah.

Accomplished the design of surface/ground water monitoring and control plans; installation and completion of ground water production/observation wells and continuous surface/ground water monitoring equipment; performed both short and long term saturated/unsaturated aquifer tests, detailed geochemical, resistivity and seismic surveys; evaluation of geophysical logs; computer simulation of surface/ground water flow systems. Areas of expertise include: soil; overburden and waste characterization; closure/post-closure plans; financial assessments; expert testimony; water rights; Notice of Violations; NPDES's; 404 permits and detailed Part B permit applications.



- 1982 - 1984                      Fox & Associates, Inc.  
Senior Hydrogeologist
- Responsible for engineering and environmental surface/ground water hydrogeological project management and monitoring and quality assurance/quality control.
- 1980 - 1982                      Ertec Rocky Mountain, Inc.  
Director of Hazardous Waste Management/Hydrogeology
- Responsible for all engineering and environmental hydrogeological activities which included marketing, scheduling, budgeting, technical quality assurance and computer modeling.
- 1976 - 1980                      Peabody Coal Company  
Environmental Manager
- Performed management related to the environmental concerns associated with the operation of three and development of five coal mines. Responsibilities included coordination of all environmental field activities, permit application preparation and functioning as regulatory authority liaison.

#### **PROFESSIONAL AFFILIATIONS**

Colorado Mining Association  
Colorado Hazardous Waste Society  
Rocky Mountain Association of Environmental Professionals  
National Water Well Association  
Denver Coal Club (President, 1985)  
Wyoming Mining Association  
American Institute of Professional Geologists  
American Institute of Mining Engineers, Chapter Treasurer

#### **REGISTRATIONS**

Professional Geologist - National Registration



**PUBLICATIONS 1985 - PRESENT**

"Mine Waste Database Management", Ground Water Monitoring Review, NWWA (in review), 1988.

"Conventional Geostatistics in Mine Waste Monitoring and Management", Ground Water Monitoring Review, NWWA (in review), with F. Hagar, 1988.

"Surface Water Quality Impact Mitigation Techniques", presented at the AIME Short Course - Remediation Technologies for the Mining Industry, 1988.

"Geostatistical Data Bases for Hazardous Waste Estimation", Pollution Engineering, with F. Hagar, 1987.

"Ground Water Quality - Regulatory Conflicts", Colorado Hazardous Waste Society, 1987.

"What is Ground Water Quality Compliance?", presented at the Rocky Mountain Association of Environmental Professionals Conference, Albuquerque, New Mexico, October 1987.

"Mining Property Transaction Liabilities - A Data Audit Procedure", HazTech International, August, 1986.

"What is Ground Water Quality Compliance? - Conflicts in Regulation", HazTech International, August, 1986.

"Hazardous Waste Regulations - Uranium and Tailings Disposal - A Regulatory Overview", Colorado Mining Association, 1985.

"Statistical Procedures for the Comparison of Ground Water Quality Data to Baseline Water Quality Data", Confidential Client, 1985.



**FRANK J. HAGAR**  
**Project Manager**

**EDUCATION**

B.S., Geological Engineering, Colorado School of Mines  
Geologic Engineer Degree, Colorado School of Mines

**EXPERIENCE SUMMARY**

1989 - Present Western Technologies Inc., Newport Beach, California  
Branch Manager, Environmental Engineering

Establish and manage office providing environmental engineering services to the Southern California region. Develop business plan, budgets, marketing strategy and resource requirements for office. Other responsibilities include project management and review for hydrologic and environmental disciplines. Developed strategy for computer applications in geosciences.

1988 - 1989 Western Technologies Inc.  
Associate

Specific responsibilities include the following types of activities:

hydrologic characterization for precious metals, industrial, uranium and coal mine sites; designing ground water well systems (including the siting, drilling, completion, testing and analysis); preparing contract bid documents; selecting drilling contractors; conducting surface water stream depletion analysis; computer simulation of surface water peak and low flows (including PMP/PMF); evaluating geochemical (including radionuclides, surface and ground water quality) trends; assessing impoundment seepage rates and amounts; conducting ground water risk assessments; assessing water rights and water right impacts; conducting ground and surface flow water balances; and conducting geophysical and geotechnical foundation analysis.

Other activities include:

two and three dimensional hydrologic and geotechnical modeling; managing large data bases; developing hydrogeology software; also mine permitting; mill licenses; NRC/DOE site characterization studies; /RI/FS; SPCC plans; NPDES; 404's and EIA/EIS projects.



1985 - 1988

Green Canyon Geosciences  
Senior Hydrogeologist

As owner of Green Canyon Geosciences, developed the business to supply both consulting services and software to address computer applications in the geosciences. Directed the business and performed the administrative tasks for the company which varied in size from one to three people, depending on the work load.

Participated in several projects including:

development and construction of twenty-five computer-based geologic models for the U.S. Air Force as part of a missile base siting study; instruction of company personnel in the modeling process and development of a ground water heat flow model for demonstration purposes at one of the sites; field and office engineering investigations for both the surface and ground water hydrology portion of several Environmental Restoration plans for pipelines, gas and oil drilling pads, and plant facilities for the Exxon LaBarge project in Wyoming; construction of three dimensional flow models for an oil refinery and a gold mine; functioning as the hydrology project leader for a multi-disciplinary study for permitting and environmental compliance of a gold mine with heap leach facility in South Dakota; direction of field drilling and field surface and ground water hydrology investigations for baseline data collection for the same mine site; conducting field hydrology investigations for a Washington gold property including drilling, geologic mapping and preliminary aquifer testing; organization and computer system from Colorado to New York, providing both user and system management instruction for the system; development and implementation of a marketing plan for the TECHBASE software; and development of software for inclusion in the TECHBASE system.

1982 - 1984

Fox Consultants, Inc.  
Engineering Geologist/Hydrogeologist

Responsible for the following activities:

Program development, implementation and documentation for geotechnical computer applications including embankment seepage analysis, slope stability analysis, saturated/unsaturated flow analysis materials testing, and data base management; and system management for VAX 11/780 installation.



1980 - 1982

Project Hydrologist, Ertec Rocky Mountain, Inc.

Responsibilities included supervision of and involvement in engineering and hydrogeology projects. Typical projects included:

project management for mine permit application in Colorado involving geologic mapping, slope stability analysis, and post-mining topography development; ground water monitoring well design, installation, testing and monitoring; siting study for a trona mine in Wyoming; unsaturated seepage modeling for hazardous waste sites in Colorado and Wyoming; geophysical/geologic studies for sand and gravel borrow source locations; and discipline coordination for third party EIS for a Montana coal mine expansion.

1978 - 1980

Staff Engineer, Zorich-Erker Engineering

Responsible for water well drilling, completion, and testing programs on over twenty-five major water resource programs. Designs were developed for wells ranging in depth from 50 to 3,000 feet, with well drilling experience in sediments and basalts. Other projects included:

pipeline design and construction supervision, site surveys; drainage design and retaining wall and footing design; preliminary dam safety inspections in conjunction with water resource development in Southern Colorado; and reservoir siting studies in Park and Costilla Counties, Colorado.

#### **PROFESSIONAL AFFILIATIONS**

National Society of Professional Engineers

National Water Well Association

Society of Mining Engineers - AIME

#### **PUBLICATIONS**

"Geostatistical Databases for Hazardous Waste Estimation," POLLUTION ENGINEERING, G.M.L. Robinson and Frank J. Hagar, 1987

"Conventional Geostatistics in Mine Waste Monitoring and Management," Ground water MONITORING REVIEW, NWWA in review, G.M.L. Robinson and Frank J. Hagar, 1988

"Mine Waste Database Management," Ground Water MONITORING REVIEW, NWWA in review, 1988



EXPERIENCE AND QUALIFICATIONS

Experience chiefly has been on programs to select and/or investigate sites for critical and controversial projects, including: hazardous waste facilities, waste migration in soil and ground water, candidate sites for nuclear-waste disposal, nuclear power plants, pipelines, and transmission line corridors. Projects have involved regional and site-specific analyses of geology, ground water, seismicity, and geotechnical conditions. Work has been done as an individual investigator, within large project teams, and as a manager or coordinator directing other professionals and subcontractors and dealing with regulatory agencies. Notable assignments have included:

Consultant handling geologic aspects of project to identify and characterize a suitable site for a proposed hazardous waste facility in Imperial County, California.

Consultant and responsible professional on regulatory reports, including: Hydrogeological Assessment Reports and Solid Waste Assessment Test proposals and reports for hazardous waste and solid waste facilities, and geology and ground water sections of Report of Waste Discharge and RCRA Part B application for a major hazardous waste facility.

Consultant with key role in planning and executing extensive hydrogeologic investigations to characterize ground water conditions and determine extent of waste constituent migration at a large hazardous waste facility.

Project manager for geology and ground water programs at six hazardous waste facilities in diverse geologic settings within California, including: detailed site characterization studies involving extensive drilling and in situ hydrologic testing, design and implementation of ground water monitoring programs to comply with EPA and state regulations, and preparation of related documentation for RCRA Part B applications, Reports of Waste Discharge, and Hydrogeological Assessment Reports.

Project manager on programs to determine extent of waste constituent migration at four (of the above mentioned) hazardous waste facilities.

Project manager on geotechnical investigations to identify suitable locations for waste management units at a large hazardous waste facility in southern California.

Coordinator of subcontractor work on geology, hydrology, and environmental aspects of environmental assessments for three candidate sites for disposal of high level nuclear waste in Gulf Coast salt domes.

MORRIS A. BALDERMAN/CONSULTING GEOLOGIST  
PO BOX 752 - DANA POINT, CA 92629 - 714/240-2396

EXPERIENCE AND QUALIFICATIONS (continued)

Project manager for geotechnical work on evaluating conditions for constructing exploratory shafts and underground openings in bedded and dome salt, including managing subcontracted work on field and laboratory geoengineering testing.

Consultant on planning the Geologic Project Manager program for disposal of high level nuclear waste in Gulf Coast salt domes.

Consultant on study (for the USNRC) of information needs for site characterization in six geologic media and the effectiveness of available exploration techniques.

Participant (in various roles) in investigations of surface and subsurface geology, faulting, and seismicity for seven nuclear power plant projects in California, Arizona, Washington, and Massachusetts.

Project geologist on regional studies of southern California and southwestern Arizona for siting power plants and selecting corridors for electric power transmission lines and water pipelines.

EMPLOYMENT HISTORY

1986 -	Self-employed consulting geologist, Dana Point, CA
1983 - 86	IT Corporation (formerly D'Appolonia Waste Management Services), Irvine, CA
1983	Battelle Project Management Division, Columbus, Ohio
1979 - 83	Self-employed consulting geologist, Dana Point, CA
1978 - 79	D'Appolonia Consulting Engineers, Laguna Niguel, CA
1973 - 77	Fugro, Inc., Long Beach, CA
1972	Woodward-McNeill & Associates, Orange, CA
1970 - 71	UCLA Institute of Geophysics, Los Angeles, CA
1969 - 70	Moore & Taber Engineers and Geologists, Anaheim, CA

PROFESSIONAL REGISTRATION

Registered geologist/certified engineering geologist (California)  
Registered environmental assessor (California)

EDUCATION

BS, Geology, UCLA, 1969  
MS, Geology, UCLA, 1972  
Classes in ground water and geochemistry, University of California (Irvine) Extension, 1988 - 1989

**TODD H. GILMER**  
**Geophysics**

**EDUCATION**

B.Sc. Geophysics (high honors), University of Minnesota, 1973.

Graduate School, Geophysics and Hydrogeology, University of Minnesota, 1975-76.

**EXPERIENCE SUMMARY**

1988 - Present   Western Technologies, Inc., Denver, Colorado  
Senior Hydrogeologist

Mr. Gilmer serves WTI's clients as a senior hydrogeologist and geophysicist. Projects include corrective action plans and site investigations for mining and milling sites.

1988 - 1989                      Gilmer Geophysics, Inc.

Gilmer Geophysics served clients in the water resources and environmental fields. Typical projects included:

- Expert witness for augmentation plan and pesticide contamination cases.
- Ground water flow and contaminant transport modeling.

1987 - 1988                      GeoWest Golden, Inc., Golden, Colorado

As co-founder and Vice President of GeoWest, Mr. Gilmer was responsible for general business and specific project operations for the corporation. Technical investigations which he managed and conducted included:

- Ground water flow modeling for water supply and water rights projects
- Ground water flow and contaminant transport modeling for an oil refinery assessment
- Oversight of RI/FS activities at two Superfund sites in metro Denver area
- Analysis of source and fate of ground water contaminants in the vicinity of percolation ponds of a major sanitation district



1986 - 1987

Gilmer Geophysics, Golden, Colorado

As the proprietor of Gilmer Geophysics, Mr. Gilmer lead or participated in the following technical investigations:

- Evaluation of source and fate of phosphorus from wastewater lagoons
- Monitoring programs for organic and inorganic contaminants at two sites
- Oversight of Superfund RI/FS activities
- Water supply development for a mine in Utah

1984 - 1986

HRS Water Consultants, Inc., Lakewood, Colorado

As Vice President of HRS Water Consultants, Mr. Gilmer managed and directed projects involving:

- Ground water flow modeling for assessing the impacts of well pumping on stream flow and water quality
- Preparation of monitoring, sampling and quality assurance plans
- Design, construction and testing of monitoring and production wells
- Overseeing Superfund RI/FS activities
- Site evaluation studies at a Superfund mining site.

1983 - 1984

CH<sub>2</sub>M Hill. Denver, Colorado.

In the position of senior hydrogeologist and geophysicist, Mr. Gilmer led or participated in the following projects:

- Managed the Lowry Landfill and Woodbury Chemical Superfund projects in Colorado
- Developed portions of Work Plans and analyzed hydrogeologic settings for mine and mill sites in Montana and New Mexico.
- Conducted ground water sampling at the Vertac site in Arkansas
- Analyzed and recommended the geophysical methods suitable for sites in Colorado, New Mexico, Montana, Arkansas and Minnesota.



1983 NUS Corporation, Pittsburgh, Pennsylvania

As a senior hydrogeologist and geophysicist, Mr. Gilmer developed the capabilities of a geophysics department and developed and implemented work plans for several early Superfund projects, including Nyanza, Massachusetts; Krysowaty Farm, New Jersey; BROS, New Jersey; McAdoo, Pennsylvania; Tysons Corner, Delaware; and Sapp Battery, Florida.

1979 - 1983 Gilmer Geophysics, Littleton and Evergreen, Colorado

As the proprietor of Gilmer Geophysics, Mr. Gilmer participated in baseline environmental studies for coal, oil shale, and precious metal mines located in New Mexico, Utah, Colorado, and Montana; developed ground water flow modeling software; explored for and developed water supplies and water rights; conducted geophysical exploration programs for shallow oil and gas deposits; and conducted a dewatering program for the cutoff wall below a major dam.

1977 - 1979 Zorich-Erker Engineering, Denver, Colorado

As a staff hydrogeologist and geophysicist, Mr. Gilmer helped develop a water supply for a major coal slurry project; analyzed water supplies and rights for alluvial and bedrock aquifers; and designed and supervised construction of deep water supply wells.

1973 - 1974 Wright Water Engineers, Denver, Colorado

Mr. Gilmer served as a staff hydrogeologist and geophysicist in the development of bedrock and alluvial water supplies for municipalities and water districts.

1973; 1975 Minnesota Geological Survey, St. Paul, Minnesota

Mr. Gilmer served as a hydrogeologist and geophysicist in evaluating ground water in southeastern Minnesota.

#### **PROFESSIONAL AFFILIATIONS**

American Geophysical Union

Association of Ground Water Scientists and Engineers (NWWA)

Colorado Ground-Water Association

Colorado Mining Association



### **PUBLICATIONS AND SYMPOSIA**

Gilmer, Todd, 1989, "A Quick Look at Health and Safety for Site Investigations", Drillstem, v. 8 no. 1, Colorado Water Well Contractors Association, Denver.

Hagar, F., G. Robinson, T. Gilmer and J. Foster, 1988, "Integrated Computerized Management, Analysis and Presentation of Hydrogeologic Data", Proc. GeoTech '88, Denver.

Gilmer, Todd, 1987, "Evaluation of Low-Yield Well Systems", Drillstem, v. 6 no. 4, CWWCA, Denver.

Gilmer, Todd, 1987, "Is There Enough Water?", Drillstem, v. 6 no. 3, CWWCA, Denver.

Gilmer, T.H., E.J. Harmon and D.M. Kronig, 1986, "Estimation of Alluvial Aquifer Characteristics from Resistivity Soundings", Proc. NWWA Conference on Surface and Borehole Geophysical Methods.

Gilmer, T.H. and E.J. Harmon, 1985, "Application of Seismic Refraction and Resistivity to Alluvial Ground Water Exploration", Colorado Ground-Water Association symposium on geophysics.

Gilmer, T.H. and M.P. Helbling, 1984, "Geophysical Investigations of a Hazardous Waste Site in Massachusetts", Proc. of EPA-NWWA Conference on Surface and Borehole Geophysics, San Antonio.

Gilmer, T.H., 1983, "Application of Microcomputers to Ground Water and Consulting Problems", CGWA lecture.

Hoagberg, R.K. and T.H. Gilmer, 1976, "Hydrogeology and Ground Water Chemistry of Olmsted County, Minnesota", Minnesota Geological Survey.

Gilmer, T.H., 1976, "Seismic Reflections from Shallow Depths", Proc. 15th Ann. Symp. on Soils Engrg. and Engrg. Geology. Boise State University, Idaho.

Chase, C.G. and T.H. Gilmer, 1973, "Precambrian Plate Tectonics: the Midcontinent Gravity High", Earth and Planetary Science Letters.

### **OTHER CERTIFICATION**

Hazardous waste site investigation health and safety course, 40 hours, NUS Corporation, 1983.

Eight hour Site Safety refresher course, 1989.



**CLIFFORD R. POLLOCK**  
**Geologist of Record**

**EDUCATION**

M.S., Engineering Geology, Texas A&M University, 1982.

B.S., Geological Engineering, Colorado School of Mines, 1972.

Hazardous Waste Site Investigation Training Course for Zone II REM/FIT Program; U.S. EPA-sponsored course; November 1983.

Military Engineering Management Courses at the U.S. Army Engineer School, at Fort Belvoir, Virginia; 1972, 1975, and 1978.

**EXPERIENCE SUMMARY**

1989 - Present Western Technologies Inc., Phoenix, Arizona  
Technical Manager

Responsible for site assessments and remedial investigations in the RI/FS Group. Participated in or directed a wide variety of projects involving hazardous waste management, environmental assessment, site remediation, ground water monitoring, geotechnical engineering, coal exploration, and earthmoving construction. He functions as a technical manager on large ground water contamination or site mitigation projects.

1986 - 1989 IT Corporation, Irvine, California  
Project and Senior Project Hydrogeologist/Project Manager

Responsible for planning and directing hazardous waste site investigations at localities throughout southern California. Responsible for all phases of hazardous waste management projects; marketing, client contact, proposal writing, work plan preparation, field investigations, review of environmental sampling data, recommending remediation or site mitigation alternatives, report preparation, budget tracking, and invoicing. Also responsible for training and managing a staff of environmental professionals including geologists and engineers. Representative project experience includes the following:

- Project Hydrogeologist for a leaking underground storage tank (LUST) investigation involving naptha-based drycleaning solvents. Developed and implemented work plan, drilled and sampled soil borings, installed and sampled monitoring wells, interpreted analytical results, and wrote interim and final engineering reports.



- Project Hydrogeologist for diesel fuel recovery and ground water treatment project at a railroad marshaling yard. Conducted aquifer pumping tests, interpreted the results within the context of the local hydrogeologic setting, analyzed soil and ground water chemical analyses, developed a conceptual design for a product recovery and ground water treatment system, and wrote final engineering report.
- Project Manager for ground water contamination assessment at a former gasoline station. Reviewed soil and ground water analytical data from previous site assessments, interpreted the results within the context of the local hydrogeologic setting, assessed viable remedial action alternatives for cleaning up soil and contaminated ground water, selected the most cost-effective option for implementation, implemented that option, and wrote engineering reports.
- Project Manager for gasoline LUST investigations at seven automotive service stations in the Los Angeles Basin and the San Diego metropolitan area. Directed field investigations (drilling and soil sampling, monitoring well installation and development, and well purging and ground water sampling), interpreted chemical analyses, developed plans for follow-on investigations or site remediation, and wrote engineering reports. Designed ground water recovery and treatment systems for four stations and an enhanced vapor extraction treatment system to treat deep-seated hydrocarbon contamination for one station. Two stations required no remediation.
- Project Manager for kerosene and stoddard solvents LUST investigation. Developed work plan; directed field investigation; interpreted analytical results; prepared three-dimensional plume configuration maps for diesel fuel, kerosene, and stoddard solvents; prepared geologic cross sections to interpret geologic controls on contaminant migration; and wrote final engineering report.
- Project Manager for spent etchant clarifier leak at a metals laminating plant. Developed and implemented work plan, directed multiphased drilling and sampling program, interpreted analytical results, assessed viable soil remediation alternatives to treat deep-seated heavy metals contamination, and wrote interim and final engineering reports.



1984 - 1986

IT Corporation, Milwaukee, Wisconsin  
Assistant Project Hydrogeologist

Investigated numerous hazardous waste sites in Illinois, Indiana, Washington, and Wisconsin for industrial clients and government agencies. These included remedial investigations at Superfund sites in Indiana and Wisconsin. Site manager and project engineer for multi-phased remedial investigation at a Superfund landfill in Indiana. Field team leader for ground water contamination investigations at leaking chemical landfills and automotive service stations. Member of RCRA Part B permit preparation team for nine waste management units at the Hanford Reservation in Richland, Washington, with emphasis on writing the Ground Water Monitoring Section. Responsible for designing and implementing environmental sampling programs; interpreting significance of environmental sampling data; drilling and installing monitoring well networks; conducting and interpreting pump tests and slug tests; designing ground water recovery systems; and preparing technical memoranda, progress status reports, and final engineering reports.

1983 - 1984

GMC Associates, Inc., Northville, Michigan  
Geotechnical Engineer and Engineering Geologist

Principal investigator for more than 40 geotechnical soil investigations at commercial facilities, industrial plants, underground pipelines, water tower, wastewater stabilization ponds, highway bridge abutments, and urban road building projects. For each project, designed and implemented a soil boring and sampling program, analyzed the field boring logs and laboratory soil test data, and prepared engineering reports. Project hydrogeologist for ground water studies at municipal sanitary landfills and waste stabilization ponds in Michigan. Supervised drilling and monitoring well installation, selected soil samples for geotechnical analyses, interpreted the results of aquifer pumping tests, and prepared final geologic reports.

1982 - 1983

Becon Construction Company (a Bechtel subsidiary), Houston, Texas  
Exploration Geologist, Mining Services Group

Becon consultant responsible for field supervision of drilling crews, geophysical borehole logging crew, and geotechnical sampling teams at a coal surface mine prospect in south Texas. Supervised continuous overburden coring, logged borings, and selected samples for geotechnical analyses. Prepared various geologic maps (structural contour, coal isopach, overburden thickness) and stratigraphic cross sections from borehole geophysical logs and borehole cuttings descriptions.



1981 - 1982

Department of Geology, Texas A&M University, College Station, Texas  
Research Assistant (Hydrogeology)

Conducted ground water investigation at a coal scrubber sludge lagoon in central Texas. Responsible for installing monitoring wells, extensive soil sampling and geotechnical testing, ground water sampling, and aquifer pump testing and interpretation. evaluated resaturation of surface mine spoil and developed a hydrochemical model for chemical evolution of ground water moving through the mined land.

1972 - 1980

U.S. Army Corps of Engineers, Fort Lewis, Washington; Fort Belvoir, Virginia; Karlsruhe, West Germany; and Fort Bragg, North Carolina.  
Military Engineer

Held numerous command and staff officer positions in 800-man construction engineer and combat engineer battalions. duties covered all phases of engineering management and construction management for civil works and military construction projects. representative projects included gravel road construction at a missile staging area, construction of concrete helicopter landing pads and asphaltic concrete runways at a U.S. Army airfield, renovation of troop barracks, and development of construction plans for an Army tank brigade motor park that was subsequently built according to plan.

#### **REGISTRATIONS/CERTIFICATIONS**

Professional Engineer: Virginia (1979); Michigan (1984); Illinois (1985).

Registered Civil Engineer: California, 1987)

Registered Geologist: California, 1988

Certified Professional Geologist: American Institute of Professional Geologists, 1989.

Certified Engineering Geologist: California, 1989.

#### **PROFESSIONAL AFFILIATIONS**

American Institute of Professional Geologists

American Geophysical Union

Association of Engineering Geologists

Association of Ground Water Scientists and Engineers

Geological Society of America



**PUBLICATIONS**

Pollock, Clifford R., 1983, "Long-Term Impacts of Surface Mining on Ground Water in Texas Delta Plain Lignite Mines," Bulletin of the Association of Engineering Geologists, Vol. 20, No. 1, pp.1-4.

Pollock, Clifford R., Gary A. Robbins, and Christopher C. Mathewson, 1983, "Ground Water Monitoring in Clay-Rich Strata--Techniques, Difficulties and Potential Solutions," Proceedings of the Third National Symposium on Aquifer Restoration and Ground Water Monitoring, National Water Well Association, Columbus, Ohio, pp. 347-354.

Pollock, Clifford R., 1982, "Groundwater Hydrology and Geochemistry of a Reclaimed Lignite Surface Mine," M.S. Thesis, Texas A&M University.

Pollock, Clifford R., And Gary A. Robbins, 1982, "Long-Term Hydrogeologic Impacts of Surface Mining in Gulf Coast, Delta Plain Lignite Mines," Geological Society of America Abstracts, Vol. 14, No. 7.

Robbins, Gary A., and Clifford R. Pollock, 1982, "Determination of Hydrogeologic Characteristics of Clay-Rich Strata," Association of Engineering Geologists, Meeting Program with Abstracts.

Pollock, Clifford R., and Christopher C. Mathewson, 1981, "Hydrogeology of a Reclaimed Lignite Surface Mine in Central Texas," Association of Engineering Geologists, Meeting Program with Abstracts.



**JON (JACK) ARENDT, R.G. 4322**  
**Senior Geologist**

**EDUCATION**

B.S. Geology, Fort Lewis College, 1977

**EXPERIENCE SUMMARY**

1989 - Present	J.J. Arendt Consulting Consultant
1988 - 1989	Alton Geoscience Geology Supervisor
1986 - Present	Sierra Gold Exploration Owner/President
1988	Applied GeoSystems Project Geologist
1984 - 1986	J.J. Arendt Consulting Consultant
1982 - 1984	Apache Energy & Minerals Project Manager
1977 - 1982	Homestake Mining Co. Exploration Geologist
1978 - 1979	Colorado Plateau Well Logging Geologist/Partner
1976	Standard Metals Corp. Mine Geologist
1974 - 1979	San Juan Minerals Owner/President



**DAVID M. MacBEAN**  
**STAFF GEOLOGIST**

**EDUCATION**

B.S., Geology, California State Polytechnic University, 1988

Currently pursuing Master of Science, Geology, California State University, Los Angeles

**EXPERIENCE SUMMARY**

1989-Present

**WESTERN TECHNOLOGIES INC.**  
Staff Geologist

Provides geotechnical and environmental engineering services. Responsible for conducting field engineering for geotechnical and environmental evaluations, overseeing field sampling and laboratory testing and performing engineering analysis to provide recommendations for foundations, roadways, and earth structures.

1988-1989

**SCHAEFER DIXON ASSOCIATES, INC.**  
Staff Geologist

Responsible for preparation and logging of fault trenches, interpretation and drafting of final report graphics such as trench logs, cone penetrometer test (CPT) sections, and geologic sections. Set up and logging of exploratory fault trenches at sites straddling the Elsinore, Wildomar, and Willard fault zones. Prepared report graphics. Mapped cut slopes and pads, clean-outs. Geologic observation of in-progress grading activity.

1987-1988

**GEOSCIENCE SUPPORT SERVICES**  
Field and Office Assistant

Responsible for preparing hydrogeologic model. Monitored existing wells and the development of new well sites. Investigated hydrogeologic conditions, prepared model for recommended dewatering techniques to allow for future limestone quarry expansion.



- 1987-1988                    RYLAND AND ASSOCIATES  
Field Assistant
- Responsible for seismic, electrical conductivity, gravity, and other geophysical investigations.
- 1985-1986                    JET PROPULSION LABORATORY  
Research Assistant for Planetary Geology
- Responsible for stereo image mapping to facilitate investigation of Mercurian geology. Prepared report graphics and gave oral/slide presentation at Mercury Conference.

#### **PROFESSIONAL AFFILIATIONS**

Geological Society of America  
Association of Engineering Geologists

#### **PUBLICATIONS**

- Kellogg Unit Foundation Grant (#3-50240) 3/83  
Age-dating and mapping Glendora Volcanics at Elephant Hill, Los Angeles County, California
- NASA/JPL Mercury Conference, Tucson, Arizona 8/86  
"Characterization of Linear Features and Structural Evolution of Mercury"
- GSA Cordilleran Section, 84th Annual Meeting, Las Vegas, NV 3/88  
"Origin of Folds in Southern Calico Mountains, San Bernardino County, California"
- National Association of Geology Teachers, Far Western Section, Spring Conference, 4/88  
"Folding of the Barstow Formation in the Southern Calico Mountains" NAGT Guidebook, Barstow College
- Bureau of Land Management/South Coast Geological Society, 4/89  
"Folding of the Barstow Formation in the Southern Calico Mountains, San Bernardino County, CA"  
in Proceedings of Symposium, Mineral Potential of the Mojave Desert



**GREGORY PEIKER**  
**Staff Geologist**

**EDUCATION**

B.S. Civil Engineering, University of the Pacific

**EXPERIENCE SUMMARY**

1989 - Present Western Technologies Inc., Denver, Colorado  
Staff Environmental Engineer

Responsible for calculations, computer modeling and field work involving surface and ground water conditions, soil conditions and physical topography including: culvert design, maps related to springs and seeps, drainage configuration, well monitoring and report and budget preparation. Involved with site characterization, testing, removal and remediation of leaking underground storage tanks; site characterization of landfills and contaminated sites in ground water. Responsibilities also include contractor selection and coordination; design and installation of petroleum vapor recovery systems at UST remediation sites; technical report preparation; and preliminary assessments and site investigations.

1988 Ed. Zueblin AG, Stuttgart, West Germany

Involved in many areas of civil engineering including product research and testing, reinforced concrete design and research, design, construction and monitoring of in-situ hazardous waste decontamination systems including heat treatment, bio-reclamation and waste containment systems.

Typical projects include:

Al-Taji, Iraq

- reinforced concrete design of iron foundry facility



Stuttgart, West Germany

- reinforced concrete design of subway facility connected to new airport

Scherweisen, Stuttgart, West Germany

- construction and monitoring of decontamination system to remove biological contaminants

Stuttgart, West Germany

- research for bioreclamation of petroleum contaminated soil as well as computerization of entire hazardous waste treatment process

### **CERTIFICATIONS**

California Engineer in Training Certifications - E.I.T. - 1987

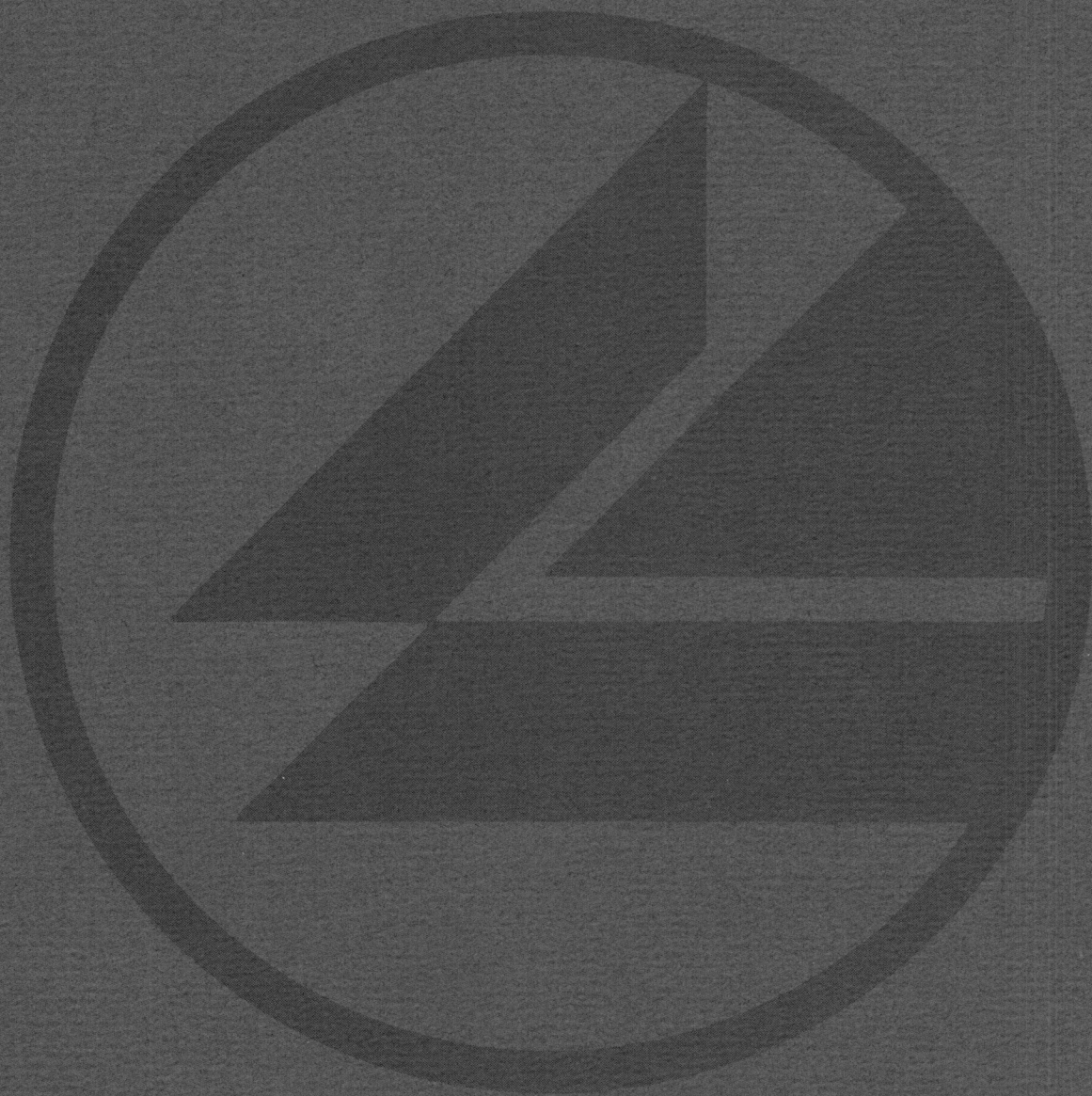
### **HEALTH AND SAFETY TRAINING**

OSHA-Approved 40-Hour Health and Safety Training - 1989

### **AFFILIATIONS**

American Society of Civil Engineers  
Tau Beta Pi





**OSCO PHASE II RFI**  
**SAMPLING AND ANALYSIS PLAN**

**1.0 INTRODUCTION**

The Oil and Solvent Process Company (OSCO) has prepared this Sampling and Analysis Plan (SAP) for the RCRA Facility Investigation (RFI) in accordance with Environmental Protection Agency (EPA) and Department of Health Services (DHS) Part B requirements for the facility. The scope of the SAP includes the following:

- Sampling/Field Measurement Procedures
- Sample Analysis.

OSCO has completed the Soil Gas Survey required for the RFI, and submitted same to the Environmental Protection Agency (EPA) and Department of Health Services (DHS) on January 19, 1990 in a report entitled "Phase I-IA Soil Gas Investigation, OSCO Facility, Azusa, California".

This SAP covers Phase II investigations of soils at the OSCO facility. Phase II investigations will include both shallow and deep soil sampling and deep soil gas characterization, so as to expedite the RFI process.

There are four sampling objectives for the sampling campaign:

- o Collect samples and analyze them for constituents listed on Table 2.6-1. From the analysis results, develop a set of target analytes for the deep soil boring program.
- o Document the presence or absence of target parameters selected after initial test pit excavation in the upper 100 feet of subsurface material
- o Document the presence or absence of selected volatile organic compounds at several selected horizons in the subsurface materials.
- o Evaluate the geologic stratification and selected physical properties of the materials that would be pertinent to the movement of contaminant materials through the subsurface.



## **2.0 SAMPLING/FIELD MEASUREMENT PROCEDURES**

Sampling methods used in the Phase II RFI will be in accordance with Characterization of Hazardous Waste Sites, A Methods Manual: Volume II. Available Sampling Methods, EPA-600/4-83-040.

### **2.1 Sampling Locations and Depths**

Sampling locations and depths are discussed in Section 2 of the Project Management Plan. The sampling locations have been specified in the EPA and DHS Permit Attachment VI-D, Figure I. Several locations have been revised based on interpretations drawn from the Phase I-IA Investigation.

### **2.2 Statistical Sufficiency**

Sample locations provided by EPA and DHS have been adopted by OSCO. Some locations have been modified based on the results of the Phase I-IA data review. The statistical sufficiency of the data is affected by several factors including sampling locations, methodology, and analyses methods. Spatial data analyses that are performed using geostatistical estimation techniques will include estimation variance maps.

### **2.3 Ancillary Data**

Ancillary data required for each sampling and analysis will be obtained by OSCO or its contractors. These data are expected to include, for the test pit samplings, the location of each subsample. For deep soil samples, the data will include sample recovery and blow count information. For soil gas analyses, the data will include the volume of gas removed before sampling.

### **2.4 Sampling Conditions**

Shallow soil samples will be obtained under "dry weather" conditions. Deep soil samples will be obtained from gravel or finer-grained zones. Deep soil gas will be obtained after purging of three volumes contained in the sand pack, screen, and riser tubing.

### **2.5 Media Sampled**

Deep and shallow soils will be sampled at the specified depths outlined in Section 2.8. Deep soil gas will also be collected for organic analytes.



## **2.6 Parameters Measured**

The shallow soil samples collected from the 1 foot zone of the test pits will be analyzed for parameters included on Table 2.6-1. Shallow soil samples taken at the three and five feet depths will be analyzed for volatile organics only. If the semi-volatile analysis indicate the presence of organic constituents, new pits will be opened immediately adjacent to the original pit and 3 and 5 foot semi-volatile samples will be collected. Based on these results, target compounds will be identified on an area-specific basis for analysis in the deep soil and soil gas samples. The target compound list will be submitted to EPA and DHS for approval.

Deep soils may also be evaluated for contaminant transport parameters, such as moisture content, hydraulic conductivity, TOC, Koc, Kow, pH, porosity and adsorptivity.

## **2.7 Sampling Frequency**

Soil samples will be obtained during test pit excavation and deep soil boring installation. Soil samples taken during test pit excavation for analysis of the parameters included in Table 2.6-1. will be collected once. If additional soil matrix samples are required, a second pit will be installed immediately adjacent to the initial excavation for collection of an undisturbed sample. Deep soil gas sampling under the Phase II RFI will also be conducted as one event upon equilibration of the soil gas and moisture system in the vicinity of the borings. However, the deep soil gas will quite likely be repeatedly sampled under subsequent phases of work.

## **2.8 Sample Types**

Shallow soil samples collected during the test pit excavation will be grab samples taken from the northernmost wall of the excavation. If obvious staining, odor or PID/FID results indicate that there is contamination on additional side walls of the excavation, additional samples will be collected and the samples will be composited in a stainless steel, enclosed compositing drum. A total of 14 test pits will be excavated. Hence, 42 soil samples will be obtained from depths of 1, 3 and 5 feet. The 1 and 3 foot samples will be wall samples. The 5 foot sample will be a floor sample collected with the excavator scoop.

Deep soil and material samples will be obtained using a split-spoon sampler. Six borings will be constructed, and approximately 10 samples per boring will be obtained, for a total of 60 samples. Samples will be taken at five (5) foot intervals in the first 20 feet of drilling; 10 foot intervals to



**TABLE 2.6-1**  
**ANALYTICAL METHODS**

Parameter	EPA or Equivalent Method	Detection Limit
<b>SOIL AND SEDIMENT</b>		
Purgeable Organic Compounds	8240	0.005 mg/kg
Volatile Halogenated Organic Compounds	8010	0.010 mg/kg
Volatile Aromatic Organic Compounds	8020	0.010 mg/kg
Semivolatile Organic Compounds	8270	0.330 mg/kg
Pesticides and PCBs	8080	0.100 mg/kg
Metals:		
Aluminum	3010/201.1b	4.0 mg/kg
Arsenic	7061	0.1 mg/kg
Barium	7080	4.0 mg/kg
Cadmium	7130	0.4 mg/kg
Chromium	7190	0.89 mg/kg
Copper	7210	0.8 mg/kg
Lead	7420	20.0 mg/kg
Manganese	7460	0.4 mg/kg
Mercury	7471	0.05 mg/kg
Nickel	7520	2.0 mg/kg
Zinc	7950	0.8 mg/kg
Physical and Chemical Soil Properties:		
Total Organic Carbon	EPA 3-73c	N/A
Soil pH	9040	N/A
Percent Moisture	ASA No. 9 Pt 1 7-2.2.2d	N/A
<b>GROUNDWATER</b>		
Purgeable Organic Compounds	8240	5-10 ug/l
Volatile Halogenated Organic Compounds	8010	0.5-1.0 ug/l
Volatile Aromatic Organic Compounds	8020	0.5-1.0 ug/l
Semivolatile Organic Compounds	8270	10-20 ug/l
Pesticides and PCBs	8080	0.1-2 ug/l
Total Organic Carbon (TOC)	9060	N/A



Parameter	EPA or Equivalent Method	Detection Limit
Metals:		
Aluminum	6010	200.0 ug/l
Arsenic	7061	100 ug/l
Barium	6010	200.0 ug/l
Cadmium	6010	5.0 ug/l
Chromium	6010	25.0 ug/l
Copper	6010	25.0 ug/l
Lead	6010	5.0 ug/l
Manganese	6010	15.0 ug/l
Mercury	7470	0.2 ug/l
Nickel	6010	40.0 ug/l
Zinc	6010	20.0 ug/l

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- a Method source unless otherwise indicated: U.S. Environmental Protection Agency, 1982. Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, SW-846, Revised November 1986
- b \_\_\_\_\_, 1979. Methods for Chemical analysis of Water and Wastes, EPA-600/14-79-020, Revised March 1983.
- c U.S. Environmental Protection Agency, 1981. Procedures for Handling and Chemical analysis of Sediment and Water samples. Contract No. EPA-4805572010
- d American Society of Agronomy, Number 9, Part 1, 1982. Methods of soil Analysis: Physical and Mineralogical Methods. 2nd Edition, 7-2.2.2, 13-2.2.1.



and including 50 foot depth and 20 foot intervals thereafter. The OSCO project manager is developing a decision tree strategy that will eliminate intermediate samples below fifty feet if concentrations of organic contaminants fall below the detection limits.

Bore hole locations will be surveyed and staked using Global Positioning Satellite Technology. Depths will be determined by direct measurement of pipe lengths. Geophysical logging will verify measured depths.

Deep soil gas samples will be grab samples. Assuming three soil gas probes in each of the six borings, a total of 18 samples will be obtained.

## **2.9 Field Sampling Operations and Procedures**

### **2.9.1 Sampling Equipment Preparation**

No filters, preservatives or adsorbing reagents are anticipated for use in the Phase II RFI. All equipment will be decontaminated prior to use according to methodology described in 2.9.10.

### **2.9.2 Forms and Sample Acquisition**

One member of the OSCO field survey team will be assigned to perform clerical duties and data recording. All information with the exception of information required on sample forms, tags and filed sheets will be kept in log books with permanently numbered pages. Applicable sample forms are attached to this plan (Appendix 2-A).

The sample and its container represent the major avenue of personal and environmental exposure. All precautions are to be taken to ensure that samples removed from the site remain in the sample container. The procedure for handling samples will be:

- o Identify sampling location, depth and sampling procedure
- o Enter location, procedure, date and time on the field data sheets.
- o Place tag on sample container
- o Place small plastic bag around container and hold in place with a rubber band around the mouth of the jar so that any sample spilled during sample transfer will not contact jar.
- o Collect sample and screw jar lid on tightly
- o Remove outer plastic bag and rubber band and dispose
- o Rinse outside of container with deionized water, and, wipe with disposable paper towels



- o Remove container from decontamination area and take close up photograph of sample. Allow container to air dry completely and provide to on site mobile lab or pack for shipment to off-site laboratory with appropriate preservatives.
- o Maintain chain of custody and file completed data sheets.

### 2.9.3 Sample Preservation

Each sample will be placed in a decontaminated glass jar, and stored in an ice chest at 4-degrees C if not immediately analyzed by the field laboratory. Soil gas samples will be analyzed on site.

### 2.9.4 Field Instrument Calibration

Field instrumentation including field analytical laboratories will be calibrated daily during field activities. Calibration information will be entered into the field notebooks and the instrument field books. Ambient air samples will be taken for soil gas analyses calibration.

### 2.9.5 Field Quality Control Samples

Type of Sample	Number Collected
Trip blanks	1/Cooler or 1 per 10 samples
Equipment Rinsate	Daily -- analyses every other day
Field Blank	1 per boring and 1 per 3 pits
Field Duplicates	10% of samples

### 2.9.6 Field Interference

There are no anticipated field interferences on site for soil and solid sampling. Since ongoing operations on site involve distillation and separation of various volatile organic substances, care will be exercised in soil gas sampling to obtain competent subsurface samples. All in-ground sampling access points will be cleaned and where appropriate decontaminated, prior to sampling.



### 2.9.7 Construction Materials and Techniques

Test pits will be excavated using a backhoe that has been decontaminated using a pressurized steam cleaner prior to excavation. The bucket and arm will be decontaminated between pit locations. Prior to leaving the site, the entire backhoe will undergo a final decontamination. Test pit soil subsamples from the 1 and 3-foot horizons will be obtained by removing soils from between cobbles and boulders using a decontaminated stainless steel trowel. Test pit samples from the 5-foot horizon will be obtained from the backhoe bucket as grab samples. Samples will subsequently be placed in decontaminated glass jars, and stored in an ice chest at 4-degrees C.

Deep soil and solid samples will be taken using a drive sampler in a boring advanced with a dual wall reverse circulation drilling rig equipped with a downhole hammer. Casing installed will be steam cleaned prior to installation in the borehole. Deep soil samples will be obtained with a decontaminated split-spoon sampler. The drilling rig will be steam or hot water cleaned before and after moving onsite, and between borings. All downhole equipment will be decontaminated in the same manner. The split-spoon sampler will be decontaminated before each use (Section 2.9.10). The drill rig will be decontaminated using a pressurized steam cleaning procedure prior to drilling and before leaving the site.

Deep soil gas sampling points will be constructed with 3/4 inch stainless steel screen surrounded by a field determined size silica sand pack. A cement and bentonite slurry will be tremmied into place to isolate the probe from other probes and the surface. A five foot long stainless steel riser will be installed above the screen. The screen section will be connected to the surface using 3/4 inch diameter schedule 80 PVC. All tubing will be steam cleaned prior to installation in the borehole.



## 2.9.8 Field Equipment and Sample Containers

**TABLE 2.9-1**  
**SUGGESTED FIELD EQUIPMENT LIST FOR DRILLING AND TRENCHING**

health and safety equipment ( Site Safety Plan )  
OVM/OVA or HNu  
sample containers, ice chests, blue ice, deionized water  
kevlar 100 foot tape, six foot stick rule, ruler, hand transit, plumb bob  
plastic sample bags, putty knife  
appropriate forms, field logs, graph paper, clip boards  
35 mm Camera and ASA 100 color print film  
Munsell chart  
hand lens/field microscope  
spray paint, indelible markers, color pencils  
site maps  
QA/QC manual  
acid, water  
decontamination buckets  
Baker tank  
steam cleaning equipment  
cellular phone  
hand trowels, rock hammer, sieves, shovels  
string, nails, flagging and stakes  
brass rings, teflon end caps, sample tubes, sample catchers  
two pipe wrenches, screw drivers, duct tape, #9 wire  
wire brushes, paper towels



Each shallow soil sample will be collected using a decontaminated stainless steel trowel. The sample will be placed in a foil lined or stainless steel bowl and divided into three portions using a "laboratory clean" stainless steel spoon. The sample portions will then be placed into appropriate sample containers.

Deep soil samples will be collected in brass liners or by the methodology that maximizes recovery. The liner ends will be capped with teflon caps and the caps secured with tape. The samples will then be available for both chemical and physical property evaluation. Depending on recovery, an alternate method may be used, whereby the sample is collected directly in the split spoon. Upon retrieval the spoon will be opened, the sample placed in a stainless steel pan and split with a laboratory clean trowel. The sample will then be placed in appropriate sample containers and sent to the appropriate laboratory.

Soil gas samples will be collected using a vacuum pump and hypodermic needle for direct, on site injection into a GC.

#### **2.9.9 Sampling Order**

The order of sample collection is necessarily dictated by on site activities. In all cases if more than one sample is needed for analyses of both chemical and physical properties, the chemical samples will be taken first. Duplicate samples will be taken from the same physical sample and will be split from the collected sample.

#### **2.9.10 Decontamination Procedures**

Between sampling events, the trowels or split spoon samplers will be washed with soap and water, rinsed with tap water and than triple rinsed with deionized water. All equipment will be allowed to air dry. All washes and rinses will be retained on site in 55 gallon drums. If oil or grease is detected during mobile lab analyses, decontamination procedures will be modified to use methanol for equipment washing.

A decontamination pad will be constructed and the excavating equipment and drilling equipment will be steam cleaned prior to use in each sampling location. The equipment will also be cleaned prior to leaving the site after final sample location construction. Soil directly beneath the decontamination pad will be sampled at the lowest elevation of the excavation and analyzed for parameters listed on Table 2.6-1 prior to lining. Samples will be collected and analyzed after decon pad decommissioning.



All wash and rinse water, to the extent possible, will be transferred to 55 gallon drums, which will be sealed, labeled as to the contents and stored on site. Any rinse solvents utilized, will to the extent possible will be collected and recycled on site by the OSCO facility. Lids will be placed on all drums and they will be placed on wooden blocks or in the OSCO drum storage facility.

## **2.10 Sample Containers**

All sample containers will be of the size and material specified by the analyzing laboratory.

## **2.11 Chain of Custody**

Preparation of the Chain of Custody (COC) shall be as follows:

- o The chain of custody shall be initiated for every sample in the field by the person collecting the sample. Every sample will be assigned a unique identification number that is entered on the chain of custody form. Samples can be grouped for shipment and use a common form. Sample tags, chain of custody forms and sample identification designations will be released daily by the field data collection coordinator.
- o If the person collecting the samples does not transport the samples to the mobile lab or the permanent lab facility, the first Relinquished By and Received By blocks on the COC will be completed in the field. The names of all members of the sampling party are to be included on the COC.
- o The person transporting the sample to the laboratory or delivering them for shipment shall sign the form as Relinquished By.
- o If the samples are shipped to the laboratory by commercial carrier, the original COC form should be sealed in a watertight container, placed in the shipping container and the container sealed prior to giving it to the carrier.
- o If the samples are directly transported to the laboratory, the original COC will be kept in the possession of the person delivering the samples.



- o For samples shipped by commercial carrier, the original waybill shall serve as an extension of the COC record between the final field custodian and receipt in the laboratory. The carrier and the waybill number should be written on the COC. If the COC has been sealed in the container prior to waybill number assignment, the waybill number should be written on a copy of the COC.
- o Upon receipt in the laboratory, the laboratory QC manager or representative shall open the shipping container, compare the contents with the COC and sign and date the record. The QC manager or representative will also record the carrier and the waybill number on the COC if it is not already present. The QC manager or representative will record the temperature inside the shipping container and record that on the COC. Discrepancies will be noted and the OSCO designated field custodian will be notified.
- o The COC is completed after sample disposal. The date and method of disposal will be noted on the COC.
- o COC's will be maintained with the project records and will be regarded as part of the project raw data.

## **2.12 Material Handling and Disposal**

Test pit spoil material will be returned to the excavated test pit after sampling. Materials will be compacted to 90 percent of the Proctor density. Boring cuttings will be collected and stored in sealed containers for eventual off-site disposal. All disposable garments and sampling equipment will also be disposed of in sealed containers for eventual off-site storage.

EPA and DHS Manifesting and DOT regulation and procedures will be adhered to for stored materials.

## **3.0 Sample Analysis**

Sample analysis shall be conducted in accordance with SW-846; Test Methods for Evaluating Solid Waste - Physical/Chemical Methods.

Laboratory QA/QC procedures will be submitted after final laboratory selection is complete.





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DRILLING CONTRACTOR \_\_\_\_\_  
DRILLING FOREMAN \_\_\_\_\_

FIELD ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_  
EDITED BY \_\_\_\_\_ DATE \_\_\_\_\_

LOCATION OF BORING							JOB NO.	CLIENT				LOCATION	
							DRILLING METHOD				BORING NO.		
											SHEET		
											OF		
							SAMPLING METHOD				DRILLING		
							WATER LEVEL		START		FINISH		
							TIME		TIME		TIME		
							DATE		DATE		DATE		
							CASING DEPTH						
DATUM							SURFACE ELEVATION						
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	USCS DESIGNATION	SURFACE CONDITIONS:				
									COLOR	SOIL TYPE	SECONDARY CHARACTERISTICS, CONSISTENCY AND REMARKS ON SOIL AND DRILLING		
							0						
							1						
							2						
							3						
							4						
							5						
							6						
							7						
							8						
							9						
							0						
							1						
							2						
							3						
							4						
							5						
							6						
							7						
							8						
							9						
							0						



DAILY DRILLING ACTIVITY LOG

PROJECT NAME/NUMBER: \_\_\_\_\_

DATE: \_\_\_\_\_

TOTAL FEET DRILLED: \_\_\_\_\_

NUMBER OF BOREHOLES: \_\_\_\_\_

TOTAL HOURS ON-SITE: \_\_\_\_\_

DOWN TIME: \_\_\_\_\_

DELAY TIME: \_\_\_\_\_

NUMBER OF PERSONNEL: \_\_\_\_\_ DRILLER \_\_\_\_\_

METHOD OF DRILLING: \_\_\_\_\_

NUMBER OF SAMPLES TAKEN: \_\_\_\_\_

TYPE OF SAMPLES: SOIL \_\_\_\_\_ ROCK \_\_\_\_\_ WATER \_\_\_\_\_

PROTECTIVE CLOTHING: \_\_\_\_\_

MATERIALS USED:

CEMENT: \_\_\_\_\_

SAND: \_\_\_\_\_

BENTONITE PELLETS: \_\_\_\_\_

PVC PIPE/SIZE: \_\_\_\_\_

PVC SCREEN/SIZE: \_\_\_\_\_

OTHER MATERIALS: \_\_\_\_\_

FIELD TESTS/SURVEYS CONDUCTED: \_\_\_\_\_

PROBLEMS ENCOUNTERED: \_\_\_\_\_

COMMENTS: \_\_\_\_\_

CERTIFIED BY:

DRILLING CHIEF: \_\_\_\_\_

SUPERVISOR: \_\_\_\_\_

**Decontamination Checklist**  
(initial if complete)

<b>Equipment</b>	<b>Detergent Wash</b>	<b>Steam Clean</b>	<b>Potable Rinse (hot tap water)</b>	<b>Deionized or Distilled Water Rinse</b>	<b>Isopropyl Rinse</b>	<b>Wrap With Aluminum Foil</b>
<b>Rig</b>						
<b>Augers</b>						
<b>Bit</b>						
<b>Auger bolts</b>						
<b>Split spoon samplers or Shelby tubes</b>						
<b>Well casing and screen</b>						
<b>Sampling equipment (specify)</b>						

DOCUMENT REVIEW SIGN-OFF SHEET

TASK: \_\_\_\_\_ COMPLETION DATE: \_\_\_\_\_

REVIEW FUNCTION	DATE RECEIVED	DATE COMPLETED	COMMENTS
-----------------	------------------	-------------------	----------

Project Engineer \_\_\_\_\_

Technical Reviewer \_\_\_\_\_

Peer Reviewer \_\_\_\_\_

Project Manager \_\_\_\_\_

R.A. Manager \_\_\_\_\_

Quality Assurance \_\_\_\_\_

Director \_\_\_\_\_

Vice President \_\_\_\_\_

NOTE:

Please sign and date after final review, or  
state status of review.



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## FIELD ACTIVITY DAILY LOG

DAILY LOG	DATE			
	NO.			
	SHEET		OF	

PROJECT NAME		PROJECT NO.	
FIELD ACTIVITY SUBJECT:			
DESCRIPTION ON DAILY ACTIVITIES AND EVENTS:			
VISITORS ON SITE:		CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.	
WEATHER CONDITIONS:		IMPORTANT TELEPHONE CALLS:	
PERSONNEL ON SITE:			
SUPERVISOR:		DATE:	

DRAWING  
NUMBERCHECKED BY  
APPROVED BYDRAWN  
BY

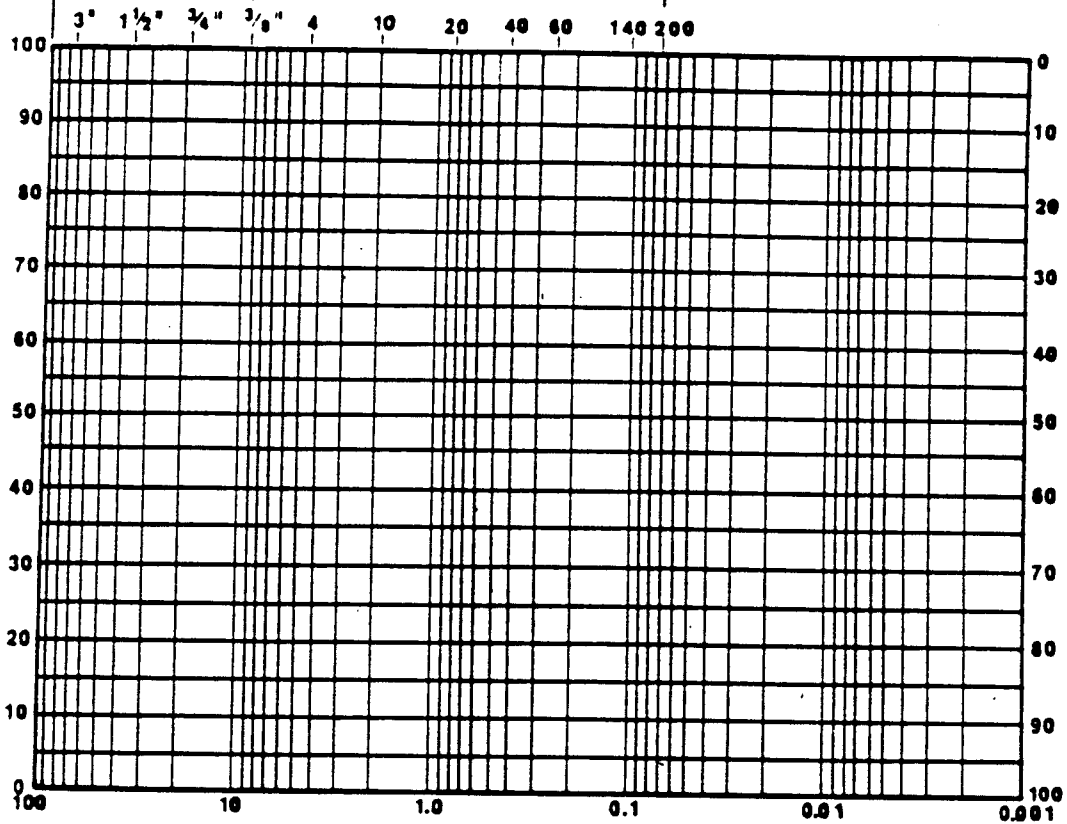
## SIEVE ANALYSIS

## HYDROMETER ANALYSIS

CLEAR SIEVE  
OPENINGS

U.S. STANDARD SIEVE NUMBERS

PERCENT FINER BY WEIGHT



PERCENT RETAINED BY WEIGHT

PARTICLE DIAMETER IN MM

COBBLES	GRAVEL		SAND			SILT AND CLAY FRACTION
	coarse	fine	coarse	medium	fine	

SYMBOL	BORING	DEPTH (ft)	SOIL DESCRIPTION	U.S.C.S.	Cc	Cu

GRAIN SIZE ANALYSIS

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## LOG OF BORING NO. \_\_\_\_\_

Project \_\_\_\_\_ Job No. \_\_\_\_\_

Elev. Top of Hole \_\_\_\_\_ Datum \_\_\_\_\_ Prepared By \_\_\_\_\_ Date \_\_\_\_\_

Type/Size of Boring \_\_\_\_\_ Rig Type \_\_\_\_\_ Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

Depth Ft	Penetration Resistance Blows/Ft.		Sample Type	Dry Density pcf	Water Content %	Soil Classification	SOIL TYPE DESCRIPTION (Modifier, Color, Density, Moisture, etc.)	Max. Size	Particle Size Distribution %				Gradation	Grain Shape	Relative Density	Plasticity	Consistency	Cementation
	C	N/R							Boulder/Cobbles	Gravel	Sand	Silt & Clay	Well Medium Poor	Angular Subangular Subrounded Rounded	Loose Med Dense Dense Very Dense	None Low Medium High	Soft Firm Stiff Very Stiff Hard	None Light Moderate Heavy
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
0																		
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
0																		

## GROUNDWATER CONDITIONS

Date \_\_\_\_\_ No Groundwater Encountered \_\_\_\_\_

Date \_\_\_\_\_ Time \_\_\_\_\_ Depth \_\_\_\_\_

Date \_\_\_\_\_ Time \_\_\_\_\_ Depth \_\_\_\_\_

NOTE: THESE DATA REPRESENT CONDITIONS AT THE LOCATION ON THE DATE THE FIELD WORK WAS PERFORMED AND SHOULD NOT BE INFERRED TO REPRESENT OTHER LOCATIONS OR DATES. SUCH DATA HAVE BEEN OBTAINED EXCLUSIVELY FOR DESIGN PURPOSES AND SHOULD NOT BE CONSTRUED AS PART OF THE CONSTRUCTION PLANS OR AS DEFINING CONSTRUCTION TECHNIQUE.



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**NOTICE OF EQUIPMENT  
CALIBRATION FAILURE**

**EQUIPMENT NUMBER** \_\_\_\_\_

**EQUIPMENT NAME** \_\_\_\_\_

**REASON FOR FAILURE TO PASS CALIBRATION** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**WAS EQUIPMENT REPAIRED OR REPLACED ?** \_\_\_\_\_

\_\_\_\_\_

**IF REPAIRED ,WAS THE CORRECTIVE ACTION ADEQUATE** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Signed** \_\_\_\_\_

# RECORD OF

☐ TELECON

☐ MEETING

Project Name

Number

Phase

Task

Sub

Date

Time

CALL FROM ☐ NAME:

CALL TO ☐

Other Participants — Name/Location/Representing:

CALL FROM ☐ NAME:

CALL TO ☐

Telephone Number:

Company Name:

Address:

Topic

City

State

Zip Code

Summary (Decisions & Specific Actions Required by Named Persons):

Required Action:

Prepared by (Signature):

Distribution:  
Original to Project File  
Copy to Project Manager  
Copy to Preparer

☐ Other Distribution (By Preparer)

PAGE \_\_\_\_ OF \_\_\_\_



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DATE							
TIME							
PAGE	OF						
PAGE							
PROJECT NO.							

## SAMPLE COLLECTION LOG

PROJECT NAME \_\_\_\_\_

SAMPLE NO. \_\_\_\_\_

SAMPLE LOCATION \_\_\_\_\_

SAMPLE TYPE \_\_\_\_\_

COMPOSITE \_\_\_\_\_ YES \_\_\_\_\_ NO

COMPOSITE TYPE \_\_\_\_\_

DEPTH OF SAMPLE \_\_\_\_\_

WEATHER \_\_\_\_\_

CONTAINERS  
USED

AMOUNT  
COLLECTED

COMMENTS:

PREPARED BY: \_\_\_\_\_

**COMMENTS:**  
(Continued)

DATE						
TIME						
PAGE	_____ OF _____					
PAGE						
PROJECT NO.						

PREPARED BY: \_\_\_\_\_

**LEGEND**

1. A SAMPLE COLLECTION LOG IS TO BE COMPLETED FOR EACH SAMPLE.
2. ALWAYS COMPLETE BOTH SIDES. IF SECOND SIDE IS NOT USED, DRAW A LINE THROUGH IT AND MARK N/A. FILL IN CONTROL BLOCK AND PREPARED BY.
3. ALL ENTRIES ON LOG ARE TO BE COMPLETED, IF NOT APPLICABLE MARK N/A.
4. DATE: USE MONTH/DAY/YEAR: I.E., 10/30/88
5. TIME: USE 24-HOUR CLOCK: I.E., 1835 FOR 6:35 P.M.
6. PAGE: EACH SAMPLE TEAM SHOULD NUMBER PAGE \_\_\_\_\_ OF \_\_\_\_\_ FOR THE DAY'S ACTIVITIES FOR ALL SHEETS PREPARED ON A SINGLE DAY, I.E., IF THERE ARE A TOTAL OF 24 PAGES (INCLUDING FRONT AND BACK) NUMBER 1 OF 24, 2 OF 24, ETC.
7. SAMPLE LOCATION: USE BORING OR MONITORING WELL NUMBER, GRID LOCATION (TRANSECT), SAMPLING STATION I.D., OR COORDINATE TO PHYSICAL FEATURES WITH DISTANCES. INCLUDE SKETCH IN COMMENT SECTION IF NECESSARY.
8. SAMPLE TYPE: USE THE FOLLOWING - SOIL; WATER (SURFACE OR GROUND); AIR (FILTERS, TUBES, AMBIENT, PERSONNEL); SLUDGE; DRUM CONTENTS; OIL; VEGETATION; WIPE; SEDIMENT.
9. COMPOSITE TYPE: I.E., 24-HOUR, LIST SAMPLE NUMBERS IN COMPOSITE, SPATIAL COMPOSITE.
10. DEPTH OF SAMPLE: GIVE UNITS, WRITE OUT UNITS SUCH AS INCHES, FEET. DON'T USE ' OR ''.
11. WEATHER: APPROXIMATE TEMPERATURE, SUN AND MOISTURE CONDITIONS.
12. CONTAINERS USED: LIST EACH CONTAINER TYPE AS NUMBER, VOLUME, MATERIAL (E.G., 2 - 1L GLASS, 4 - 40 ML GLASS VIAL, 1 - 400 ML PLASTIC, 1 - 3 INCH STEEL TUBE; 1 - 8 OZ. GLASS JAR).
13. AMOUNT COLLECTED: VOLUME IN CONTAINERS (E.G., 1/2 FULL).



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**SHIPMENT INFORMATION**  
(Field to Lab by Telephone)

Date of Shipment: \_\_\_\_\_

Laboratory Destination: \_\_\_\_\_

Laboratory Project Contact: \_\_\_\_\_  
(Name) (Telephone Number)

Number Containers Shipped: \_\_\_\_\_

Mode of Shipment: \_\_\_\_\_

Shipment Number(s): \_\_\_\_\_

Time of Shipment: \_\_\_\_\_

Date/Time of Shipping Information Transmitted to Lab: \_\_\_\_\_

Individual Contacting Lab: \_\_\_\_\_

Individual in Lab Receiving Information: \_\_\_\_\_

**NOTE: PROVIDE THIS INFORMATION TO RECEIVING  
LABORATORY AS SOON AS POSSIBLE AFTER  
SAMPLES ARE SHIPPED.**

**OSCO PHASE II RFI**  
**OSCO DATA MANAGEMENT PLAN**

## **1.0 INTRODUCTION**

The following Data Management Plan (DMP) has been prepared by OSCO to provide guidelines for the collection, storage, analysis, reporting and display of the data collected for the RCRA Facility Investigation (RFI). The scope of the DMP includes the following:

- Data Acquisition
- Data Security
- Data Reporting and Display
- Data Transfer

This OSCO DMP is in effect for the Phase II investigations of the RFI including the shallow and deep soil sampling and the deep soil gas testing, data collection and analyses.

## **2.0 DATA ACQUISITION**

### **2.1 Data Types**

Data anticipated to be collected and generated during the Phase II activities include:

- o Soil boring and trench logs
- o Geophysical logs and data
- o Chemical analyses
- o Physical properties
- o Chain of custody
- o Topography
- o Physical features including buildings etc.
- o Sampling locations
- o Soil gas analyses

The data may be collected on a regular or irregular basis or on a single event basis depending on the sampling protocols outlined in the applicable SAP.



## **2.2 Data Collection**

Data will be generated by several entities during phase II of the project. OSCO and their consultants, drillers, excavators and analytical laboratories will be on site performing activities that will be recorded and filed. Repetitive tasks will be controlled by appropriated QA/QC procedures and the SAP. A standard format will be established with each contractor for recording each event.

## **2.3 Digital Data Entry**

The results and observations obtained and recorded in the field will be entered into the TECHBASE data base management system. Hand data entry will be verified by comparison to the entry forms, posting of appropriate data on local maps and statistical review for outliers. Data obtained from laboratories on magnetic media or via modem will be verified using statistical analysis, posting and data plots and a randomly selected sample set for verification.

## **2.4 Database Design**

A relational database management system and associated technical application package will be used to store and manipulate data collected during the project. Each sample taken will be identified with a unique combination of site or sample designation and date and time that the information was gathered. A unique sequential sample number will be assigned to each sample. Sample identifications used by laboratories or outside contractors will also be carried in the database to allow cross referencing between activities, invoicing and results tabulations. The site designation will be tied to a location with local x, y, z coordinates as well as latitude and longitude and California state plane coordinates as determined using a global positioning system (GPS).

## **3.0 DATA SECURITY**

OSCO will maintain a rigid backup schedule for both digital and paper copies of data to provide adequate protection against accidental loss or data corruption.



### **3.1 Documents, Notes and Memoranda**

Any document generated or received by OSCO will be logged into a document control system that will include at least the following information:

- document control number
- date received
- source
- subject grouping

The document will be filed in both the appropriate subdiscipline file and a chron file kept for the project. On a weekly basis, the chron file will be photocopied and a copy of the file will be sent to Mr. Peter Coutts for off-site storage. Photocopies of documents, data and pertinent memorandum saved for backup will be labeled as copies and dated with the appropriate copy date.

### **3.2 Computer Data**

OSCO will maintain a primary computer with the project database residing on it. The machine will be locked using the manufacturer provided keyboard or hard drive lock provided with the machine. Any data releases or transfer from the primary data repository will only be made with the data managers knowledge and consent. The data manager will perform incremental backup of project files daily ( Tuesday through Friday ) and full weekly backups on Monday morning of each week. Full weekly backups will be stored off site at a location selected by Mr. Peter Coutts.

## **4.0 DATA ANALYSIS AND DISPLAY**

### **4.1 Analysis Verification**

Analytical software will be either verified using standard test data or will be a package that is recognized by the technical community as providing mathematically correct results.

### **4.1 Reporting Formats**

Data reports and information generated for this project will include on each sheet the project name, date, originator, page of total pages. Typewritten or printer plotter generated documents will bear the notation "draft" until an OSCO designated reviewer releases the documents for final report. A standard sign off sheet



will accompany any such released documents. Data reports will be designed to fit on either 8.5" by 11" sheets or 11" by 17" tables. The minimum type size for data reports generated during this project will be 20 pts. Raw data will be tabulated and presented in the order that it was taken or received from the laboratory or contractor.

#### **4.2 Graphic Format**

The final graphic format will be approved by the OSCO project manager. Each graphic will at a minimum contain the following information:

- date
- prepared by
- revision no
- revision date
- project number
- title

Maps will contain a bar scale, north arrow and legend. Any graphic reduced for presentation will contain the notation NOT TO SCALE. Graphics will be labeled as drafts until an OSCO designated reviewer releases in writing the graphic as a final copy.

#### **4.3 Digital Data Exchange Formats**

Unless otherwise authorized by the OSCO project manager and approved by the Environmental Protection Agency and Department of Health Services, data will be transferred to authorized and appropriate agencies and individuals on 5.25" 360kb magnetic floppy disks formatted using version 2.0 or higher of MS-DOS.



## SITE SAFETY PLAN

**Project Name:** *OSCO Facility*

**Project Number:** *219-9J-005*

**Location:** *Peckham Road and First Street, Azusa, California*

**Date Prepared/By:** *February 15, 1990/Barb Ford/Denver*

**Date Reviewed/By:**

**Date Revised/By:**

**Site History:** The OSCO facility has been in operation since 1954 and is presently regulated by RCRA. Operations at the facility have historically included the recycling of spent solvents through distillation and related processes. The operations include the handling and temporary storage of spent and recycled solvents.



Three areas of known releases of volatile organic compounds (VOCs) have occurred at the facility: the sump area, the surface runoff pond and the drum storage area. The sump area has been excavated to the satisfaction of the Los Angeles County authorities. The surface runoff pond has been excavated to a point where less than 5 ppb of VOCs occur below the excavation. In the drum storage area, an investigation is ongoing with a large part of the area having been excavated in 1988. The EPA alleges that other areas of standing liquid and stained soil have occurred at the facility.

Following a soil gas survey conducted in October, 1989, three areas of soil gas contamination were identified. The contamination included trichloroethylene, trichloroethane, and perchloroethylene.

III. HAZARD EVALUATION

**Physical Hazard(s):** Drum storage areas; heavy equipment; overhead services, drilling noise; heat; dust and excavation.

**Chemical Hazard(s):** The chemical hazards anticipated include the following: Trichloroethylene, 1,1,1 - trichloroethane, tetrachloroethylene, carbon tetrachloride, toluene and methylene chloride (refer to attached chemical data sheets for these compounds).

IV LOGISTICS

**Decontamination Procedures:** Since organic compounds will be sampled for during the drilling and trench construction activities, decontamination of drilling and sampling equipment will include the following: Alconox and water wash, tap water rinse, triple rinsed with hexane and acetone rinsed with distilled water (equipment will be air-dried between

SITE SAFETY PLAN

---

successive rinses). Prior to any heavy equipment exiting the site, it will undergo a hot steam wash.

**Special Equipment:** Backhoe, drilling rig, wash tubs for decontamination, Draeger pump and tubes, full-faced respirator with GCM-H Cartridges, self-contained breathing apparatus (refer to equipment list, page 8) OVM, steam cleaner.

**Site Entry Procedures:** The boreholes, trenches and sample locations will be identified prior to the construction activities. The crew will enter the site in Level D Health and Safety Protection. Depending upon response of the PID/FID monitoring of the breathing zone and Draeger tube response, the level of protection will be upgraded accordingly. Upon encountering volatile organic concentrations above background, hazard flagging tape (yellow and red) should be used to restrict entry into the work space depending upon the levels of total volatile organic compounds detected in the ambient air. The action levels indicated on page 5 will be used to define that level of protection necessary when inside that particular zone. The action levels are based upon the total volatile organic concentrations above background in the breathing space. Since carbon tetrachloride has the lowest permissible exposure limit (PEL) of those contaminants anticipated during activities, the action levels have been established from carbon tetrachloride. Further determination of the total volatile organic concentrations may be quantified using Draeger color indicator tubes. Upon identification of the presence of a contaminant, the level of protection may be modified.

**Work Limitations:** Outside work during daylight hours not to exceed 12 hours per day. No confined space entry. Activities onsite are limited to drilling, trench construction and sampling in accordance with procedures described in the sampling plan; Buddy system will be implemented.

WESTERN TECHNOLOGIES INC.

SITE SAFETY PLAN

---

Investigation - Derived Material Disposal: To be handled by Chemical Waste Management, Inc. Materials anticipated are tyveks (if needed), Analytical disposables, etc.

Team Member\*

Responsibility

To be determined

To be determined

\*All Team Members who will be involved in on-site activities have undergone the required OSHA-approved training and medical surveillance program in accordance with 29 CFR 1910.120.

Action Levels: the following action levels are for respiratory and skin protection for tetrachloroethylene.

Level D: 02 19.5% or 25%, explosive atmosphere 10% LEL, organic vapors above background levels, particulates 7 mg/m<sup>3</sup>, other TLV 1 ppm (ACGIH)

Level C: 02 19.5% or 25%, explosive atmosphere 25% LEL, organic vapors: 1 to 5 ppm, particulates \_\_\_\_ mg/m<sup>3</sup>, other \_\_\_\_.

Level B: 02 19.5% or 25%, explosive atmosphere 25% LEL, organic vapors: 5 to 50 ppm, particulates \_\_\_\_ mg/m<sup>3</sup>, other \_\_\_\_.

Level A: 02 19.5% or 25%, explosive atmosphere 25% LEL, organic vapors >50 ppm, particulates \_\_\_\_ mg/m<sup>3</sup>, dermal toxicity, other \_\_\_\_.



WESTERN TECHNOLOGIES INC.

SITE SAFETY PLAN

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V. EMERGENCY INFORMATION

(From Reference Source)

**Acute Exposure Symptoms**

**First Aid**

**Ambulance:**

(818) 334-9311

**Hospital Emergency Room:**

(818) 359-3243 St. Teresita

**Hospital Address:**

St. Teresita Hospital, 1210  
Royal Oaks Drive, Azusa,  
California

**Police:**

(818) 334-2943

**Fire Department:**

(818) 334-9311

**Site Contact Number:**

Leo Stahlecker (818) 334-5117

**WTI Office/Denver:**

(303) 233-2991

**WTI Office/Riverside:**

(714) 780-5544

**Water Supply On Site:**

yes

**Electricity Source:**

yes

**Corporate Health & Safety Officer:**

STEVE BARNES - 1-800-535-7332

(WTI - Phoenix)

**Directions to Hospital:** Head north from OSCO property to Interstate 210. Take I-210 west to Mount Olive Road. Head north on Mount Olive Road to Royal Oaks Drive. Take Royal Oaks Drive west to 120 Royal Oaks Road -- St. Teresita Hospital. Map with route is attached.



VI. EQUIPMENT LIST

*Protective Clothing*

**Level D**

*hardhat  
safety glasses  
steel toed boots  
coveralls  
hearing protection*

*Monitoring Equipment*

*Draeger pump with color  
indicator tubes, including:*

*PCE  
TCE  
TCA  
Carbon Tetrachloride*

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**Level C**

*air purifying  
respirator  
GEM-H Cartridges  
tyveks  
latex gloves  
rubber gloves  
rubber boots  
disposable booties*

*Tubes should be selected upon  
available data from soil gas  
survey and contaminants of  
concern for that location.  
Sample every 15 minutes in zone  
from 0 - 25 feet.*

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**Level B**

*SCBA or supplied air  
double gloves  
Level C protective  
clothing  
Level D protective  
clothing  
two way radio*

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VII. ON-SITE SAFETY MEETING

Topics to be discussed:

1. Chemical Hazards: *As listed in proposal*
2. Physical Hazards: *Heavy machinery*
3. Action Levels: *Remove to fresh air, if severe to hospital*
4. Exposure Symptoms & First Aid: *dizziness, nausea, vomiting*
5. Route to the nearest hospital: *As listed in proposal*

ATTENDEES

Signature

Duty

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